THIS is the time of year when a business man undergoes a complex. Every business man. One might call it the Spring Persecution Complex. It consists of various things, and reacts differently on everybody. The chemist suddenly finds his devoted lab is only another job, and develops a yen for a pipe, old clothes, and his garden. He also wants an increase in salary. The production manager goes browsing for old books, and spends evenings repairing the damages done to his fly rod by the neighbor's children who used it to portray Sir Launcelot. The engineers spend the noon hour at baseball, garnished well with iodine. The purchasing agent drowses over catalogues, feet on desk, and decides on a suitable spot to which he consigns all solicitors. These latter are buying new top-coats and old cigars, and play poker with a more definite abandon.

The shipping departments organize picnics, getting a bit sick of the shop lunches. The office boys shoot craps off in one corner, while the feminine staff titters and discusses new clothes. The average day laborer doesn't know what to do, so he does it most earnestly.

And the boss? He may be out pepping up a laggard account, he may be scurrying around trying to inflict some needed discipline or even going into huddles with his salesmen and re-routing their territories. He may be.

But we have a hunch that if he is the boss we are thinking of, he has got one hand on his golf bag and the other on the phone, and at 3:05 P. M. is doing his first—and last—bit of the day's work before joining the boys at the first tee.

Ho-Hum! It's five after three. Guess we'll run along.

THE PUBLISHERS.

PLASTICS & MOLDED PRODUCTS

REG. U. S. PAT. OFFICE

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 6 MAY, 1930 No. 5

Contents

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PLASTICS

(Reg. U. S. Pat. Off.)

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 6 MAY, 1930 No. 5

Recent Progress in Thermoplastic Rubber

Growing list of useful products based on rubber bring this raw material more and more into the purview of plastics as defined in this Journal at its inception

By Carl Marx

RUBBER, as ordinarily considered from our standpoint, is not a plastic composition in the same sense that the phenolic resins and the pyroxylin products are, because it requires the addition of sulfur to vulcanize it before articles of general utility can be fabricated from it. In the case of hard rubber, it is true that products are obtained that in many respects resemble indurated phenolic resin product. In fact, the earlier uses of the phenolic resins was to produce masses that were suitable as substitutes for hard rubber.

Rubber as a Plastic

Ebonite, or hard rubber, has, however, so many useful properties that it has not been displaced to any great extent by the more modern thermoplastic heat-setting substances, except where speed of operation, and lighter colors were desirable. Soft vulcanized rubber of course reigns supreme in the elastics field such as rubber tires, rubber hose and surgical rubber goods. Nothing has so far been discovered, nor is likely to be for some time to come, that will replace soft vulcanized rubber.

The question has often been asked us why we apparently studiedly avoided rubber. It is not because we did not recognize its tremendous importance, but rather because the subject was well represented in numerous excellent journals.

Vulcanized rubber we shall leave to those covering this field but anything that *per se* is thermoplastic is within the scope of our journal.

During the past few years considerable research has been carried on by the rubber chemists to produce a thermoplastic rubber product that did not require the addition of sulfur to vulcanize it; and which could be used like other thermoplastic substances such as shellac, gutta-percha and the like. We have reviewed quite a number of patents covering such methods during the past two years (see indexes of PLASTICS). A few recent additions to this growing list of useful thermoplastic rubber products may therefore be of interest.

These products are the work of Harry L. Fisher, of Leonia, N. J. and William C. Geer, of New Rochelle, N. Y., and are described in a series of patents (U. S. P. 1,731,483 to 1,731,488 inclusive), that issued on October 15, 1929, being all assigned to the B. F. Goodrich Co., of New York.

Taking up the patents in their numerical order, 1,731,483 relates to a method for providing an improved, moldable compositions suitable for the preparation of such articles as phonograph records, radio dials, molded insulation, telephone receivers or battery jars.

Permanently Thermoplastic Molding Compositions

By way of example of the preparation of friable heat-plastic derivatives of rubber, masticate upon a rubber mill 100 parts by weight of rubber and gradually add thereto during mastication a mixture of 8 parts of p-toluene sulfonic acid and 2 parts sulfuric acid (sp. gr. 1.84). When thoroughly mixed, the mass is heated, its temperature being gradually raised until a vigorous exothermal reaction is set up therein. It has been found satisfactory to heat

the mass in an air oven at about 140° C. for 6 to 8 hours. Alternately, for the toluene sulfonic and sulfuric acid of the above example, we may substitute p-toluene sulfonyl chloride, 12 parts; p-toluene sulfonic acid 13 parts; or other sulfonic acids and sulfonyl chlorides, or mixtures thereof or with sulfuric acid in substantially the proportions indicated.

The reaction products of the above example, when cooled to normal temperatures, are hard, friable, thermoplastic derivatives of rubber, which are in general inert with respect to, and are easily miscible with, pigments, fiber, colors, softening agents and the like and that the compositions so formed may be repeatedly remolded, have a low moisture absorption and are exceptionally valuable for sound record compositions. By remolding or otherwise reworking the rubber reaction product after the completion of the reaction, porosity of the final molded article may be avoided.

Shellac Substitute

An example of a moldable composition of the class specified is as follows:

Shellac-like derivative of rubber, as above described—300 to 400 parts by weight.

Lubricant, softener or flowing agent such as paraffin, stearic acid, palm oil, japanese wax or candelilla wax—40 to 30 parts.

Pigments or filling agents such as iron oxide, infusorial earth, clay, gas black, lithopone or zinc oxide—a total of 200 to 600 parts.

Fiber, such as cotton flock—10 to 30 parts.

Color, such as gas black—10 to 40 parts.

Example 2.—For the production of sound-record compositions, we preferably employ ingredients within the following range:

Hard, friable, thermoplastic derivative of rubber—300 parts by weight.

Lubricant, softener or flowing agent, such as paraffin, stearic acid, palm oil, and the like—10 to 50 parts.

Pigments, such as oxide of iron, 100 to 300 parts.

Fillers, such as infusorial earth, 100 to 250 parts.

Fiber, such as cotton flock, 10 to 50 parts.

Color, such as gas black, 10 to 50 parts.

In either of the above Examples 1 and 2, the friable materials are preferably ground together and the powdered mixture placed on a hot rubber mill whereby it is fluxed and worked into a continuous sheet. The liquid or soft ingredients which do not grind readily are then added to the mass and thoroughly incorporated therein. The mass is then sheeted out to the thickness desired and may be stored for later use. While still hot it may be cut into disks or otherwise roughly shaped suitably for subsequent molding operations and the scrap returned to the hot mill. The partially formed articles or the uncut sheet may be then warmed on a hot plate or in an oven and hot molded to their final shape.

An alternative method of molding comprises grinding compositions of the above type either before or after fluxing on a hot mill and molding the powder in hot molds under heavy pressure.

Sound Records

A specific example of a high grade moldable composition suitable for phonograph records comprises the reaction product of rubber with a mixture of 8 parts by weight of para-toluene sulfonic acid and 2 parts of sulfuric acid—300 parts by weight, infusorial earth 240 parts, raw sienna — 330 parts, ground quartz—50 parts, gas black—30 parts, cotton flock—20 parts and carnauba wax—30 parts.

These ingredients are ground together and fluxed to a continuous sheet from which blank disks are cut. The blank disks are rewarmed on a hot plate and molded in a hot record press

A thermo plastic composition trices being cooled prior to removal of the completed record. Sound records prepared from this type of composition are found to possess exceptional tone qualities, substantially superior to records formed of shellac compositions.

The next patent, 1,731,484, of William C. Geer, describes compositions similar to gutta-percha which is made by heating rubber with phenol sulfonic acid. Several examples are described, the one yielding a product with properties approaching those of shellac.

Alternate Heating and Cooling

1000 parts of crude rubber, and 100 parts of p-toluene-sulfonyl-chloride are thoroughly mixed and the mass formed into sheets approximately ½ inch in thickness. These sheets are heated for 8 hours at 210° F., cooled and reheated for 8 hours at 230° F., care being taken to prevent substantial rise in temperature inside the mass above the temperature of the oven. The product is then intimately mixed with 30 parts of stearic acid. The mixture is a tough but pliable plastic which may be tubed and calendered but which hardens and approaches the characteristics of shellac by further reaction of its ingredients, as upon long standing or upon being hot molded.

Geer and Fisher are responsible for the next patent, 1,731,485, which covers certain special features of the process. For example—A balata-like derivative of rubber is prepared by mixing 100 parts by weight of purified rubber with 5 to 6 parts of phenol sulfonic acid, and the mix is heated in a compact mass in an oven maintained at a temperature of 286° F. for six hours. (The use of unpurified rubber in this example requires from 7 to 7.5 parts of phenol sulfonic acid to produce a product of similar physical proper-

(*Continued on page 283*)

The Plastic Industries of Japan

The pyroxylin plastics industries are developing rapidly, and a start is being made on the resinoids

By R. Sekido

Publisher of Japan Pyroxylin Plastics Trade Journal

STATISTICS on the plastic industries of the various countries have been much in demand, but are rarely obtainable, as it is only very recently that plastics as such have been given any consideration by the various data-collecting agencies. This has also been true of Japan, whose plastics industry, especially in the pyroxylin plastic field is becoming one of the world factors in this field. Through the efforts of our Japanese correspondent, Mr. R. Sekido, who also publishes, in Japanese, a pyroxylin plastic trade journal, we are able to reproduce here some authentic figures compiled by him. This information has never before been published, and throws an interesting light on the enterprise of the Japanese in building up the plastics industries.

The statistics here reproduced are original and have been especially compiled by our ese associate, Mr. R. Sekido who publishes the only Japanese plastics journal.

Japan's Export Trade

The export trade of the Japanese empire as to pyroxylin plastics is given in Table 1, which is based on government figures and the customs authorities of Japan. The Japanese manufacturers' associations also form the basis for the correctness of these figures, and in some instances are even more accurate than the official data. Last year's foreign trade as far as Japanese exports of pyroxylin plastics were concerned was quite favorable, but at present conditions are not near as good, this being in part due to the lower tone of the silver-exchange rate in the orient and the higher foreign exchange rates.

The table shows the exports of Celluloid combs, toys and dolls, and in sheets. Tooth brushes, imitation pearl and natural camphor are also listed separately. The Japanese units are given, the equivalents being: 1 picul=133½ lbs. avoirdupois, and 1 yen=49.85 cents on a normal exchange basis.

TABLE I

	1928		1929	
	Quantities In Units of 1000 gross	Values In Units of 1000 yen*	Quantities In Units of 1000 gross	Values In Units of 1000 yen
Celluloid Combs	158	786	204	963
Celluloid Manufactures		1,015		1,834
Celluloid Toys & Dolls		4,230		5,573
	1,000 piculs		1,000 piculs*	
Celluloid (Sheets)	164	250	340	400
Total		6,281		8,770
	1,000 dozens		1,000 dozens	
Tooth Brushes	3,677	3,221	4,517	4,110
Imitation Pearls		3,887		4,557
	1,000 piculs		1,000 piculs	
Natural Camphor	3,661	5,449	4,127	6,152

*1 picul=133½ lbs. advoirdupois.
*1 yen=49.85 cents.

Who Buys

As to the comb trade, Japan's best customer is China, followed by the Phillippine Islands (Manila), British India and the British Straits Settlements. Among the celluloid manufactures, bangles predomintate. These ornaments alone yearly are exported in amounts equivalent to a value of one million yen, being used chiefly by the Hindus. It is expected that this quantity will gradually diminish as the use of bangles in India is going gradually out of style, and the inflammability of the product is beginning to be appreciated by the purchasers.

As regards the celluloid toys and doll trade, and especially tooth brushes, the past year has broken all Japanese export figures, this being attributed in no small part to the changed tariff policy of the United States. The largest consumers of Japanese products of this category are the United States, followed in order by Great Britain, British India, China and Germany. Tooth brushes made up about 60% of this trade. Celluloid hair-brushes for toilet use were exported during the past year to the value of 300,000 yen. The celluloid sheets were mostly exported to China where local industry con-

sumes it, though the plants are quite primitive. During the past year the only real celluloid "factory" in China burnt down, but is being reconstructed. The manager of this Chinese plant is the only Chinese from the Japanese technical school familiar with this branch of the plastics art, and has had considerable experience with it.

The imitation pearl trade is this Japanese industry because of the rise in production of German synthetic camphor.

TABLE II

	Made by The Dainippon-Celluloid Co., Ltd. Picul	Made by many other Small factories Picul	Total
1925	46,489	21,894	68,382
1926	37,703	21,866	59,569
1927	39,452	25,935	65,387
1928	52,569	31,300	83,869
1929 (Nine months)	46,235	29,600	75,835

This development of smaller companies is somewhat recent and is due to a change in the policy of the government camphor monopoly, which is now administered by Japanese instead of Formosan executives. An interesting fact is the wide distribution of this Japanese pyroxylin plastic industry. We here reproduce a map showing the location of the various plants. Their names, location and production during 1928 and the first nine months of 1929 are given in Table 3.

only a minor matter. The entire pyroxylin plastic trade of Japan in 1929 can safely be estimated at about twelve million yen (roughly six million dollars).

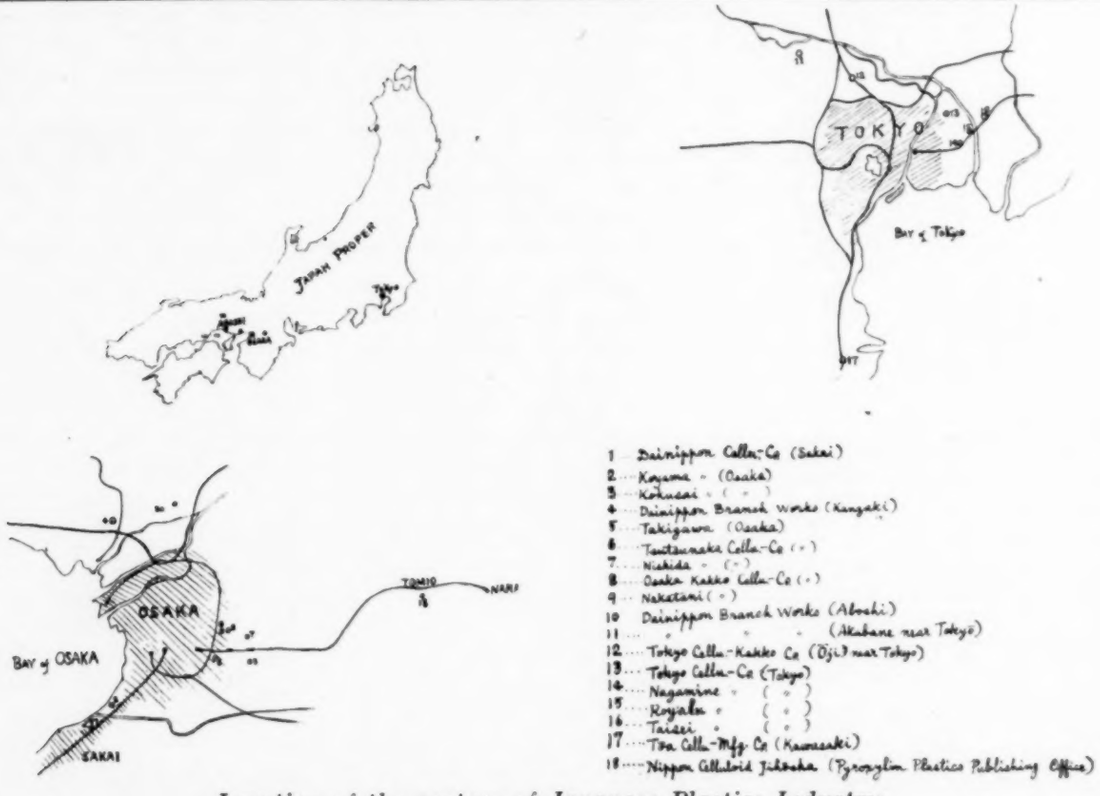
This does not include the profitable camphor trade, the exports last year being about three million yen, of which the United States took about one half, the other countries taking the balance about in the order British India, France, Germany and Great Britain. Quite recently there was considerable excitement over the threat to

Pyroxylin Plastic Production in Japan

As in other countries, actual trustworthy figures of the total production of pyroxylin plastics are hard to obtain. The official figures compiled by the Japanese government monopoly bureau are believed however to be quite authentic. The main Japanese pyroxylin plastic production is in the hands of a large Company, the Dainippon Celluloid Company, Ltd., the balance of the trade being scattered. A comparative table of the trend of the pyroxylin plastic production of Japan, in terms of piculs of 133⅓ lbs. each is reproduced here. The main factory produces about 1¾ times as much as all the other small plants put together.

Smaller Factories

The local smaller factories are mostly in two districts, centering about Osaka and Tokyo. One of these districts consumed about 2,900 piculs of camphor and the other a little



Location of the centers of Japanese Plastics Industry

TABLE III

Names	Location	1928	9 months 1929
		Picul	Picul
Kokusai Cellu-Co., Ltd.	Osaka	2,076	1,234
(1) This firm burned last year a part of works (Nitration works)			
Tsutsunaka Co., Ltd.	"	2,762	2,699
(2) (Large Toy and Dolls Mfg. works in Osaka)			
Koyama Co., Ltd.	"	2,813	1,808
J. Nakatani	"	1,013	744
Osaka Cellu-Kaco Co., Ltd.	"	2,180	1,443
B. Nishida	"	563	448
Takigawa	"	3,274	2,876
Sun Cellu-Co., Ltd.	" (Sakai)	1,593	198
(3) (This firm is now out of business)			
Total	Osaka	16,274	11,450
Tokyo Cellu-Kacosho, Ltd.	Tokyo (Oji)	4,565	5,996
(4) (Larger Toys and Dolls Mfg. works)			
Toa Cellu-Mfg., Co., Ltd.	"	648	912
Vagamine Mfg. Co., Ltd.	"	2,152	2,448
(5) (Toys and Dolls Mfg. works)			
Tokyo Cellu-Co., Ltd.	"	3,334	2,517
(6) (Working up waste) the Dainippon Cellu-Co. Ltd's subsidary firm			
Royal Cellu Co., Ltd.	"	684	2,126
(10) (Large Toys and Dolls Mfg., The Dainippon Cellu-Co. Ltd., sub-firm)			
Taishe Cellu Co., Ltd.	"	3,708	4,956
Total	Tokyo	15,091	18,955

less than 1,600 piculs. Part of the production is re-worked material from the waste accumulated and traded in at Osaka.

It will be noticed that the pyroxylin plastic industry of Japan is developing rapidly owing to the way the camphor industry is being handled, thus making it easier for the manufacturer to obtain this commodity. The figure for 1928 showed a production of 83,900 piculs, of a value of at least 17 million yen as finished articles. In 1929 the market situation was not so favorable, mostly by reason of loss in foreign trade through general business depression and falling off of domestic consumption by the going out of style of hair-ornaments.

The pyroxylin lacquer industry in Japan is getting on fairly well, and the manufacture

(*Continued on page 282*)

Molded Panels With Raised Designs

THE production of panels having raised designs, or ornamented in a distinctive matter, is of increasing interest. Quite a number of methods have been proposed since the days of the old black or brown plain radio panels. The use of metallic panels on radio sets has practically wiped out the market for the laminated material in this field, but many new applications are being found.

Brilliant Inlays

Indicative of the trend of five years ago, but of course applicable to conditions of today, is an invention of Harry Parker Mills, of Toronto, Canada (assigned to Bakelite Corp.) In his United States Patent 1,742,616 (issued Jan. 7, 1930), Mills describes a method of ornamenting the surface of a laminated radio or other panel in which the molding plate contains recesses that are filled with a thermoplastic molding composition before the finished panel is molded.

According to the new method worked out it is possible to produce directly from the mold a finished article which bears the design in any desired color, and of which the brilliance is not obscured by an overlying varnish film.

The following will serve as illustrations of methods.

1. The face of the mold, or in the case of laminated stock the burnished plate of copper or other metal against which the stock is pressed, is engraved in accordance with the desired design. The lines in the mold or metal sheet are then filled with a molding mixture comprising a reactive phenol resin and whatever coloring matter may be desired, such as gilt, bronze, or other metal powder or the like. The engraved copper plate or other die containing this molding mixture is then pressed against the laminated stock to which the design is to be transferred. If this stock is wholly uncured it contains fusible material which causes the lines to blur, since it allows some flow. It is advisible therefore to partially cure the backing until it reaches a condition where there is no longer sufficient flow to cause blurring, although sufficient plasticity is retained to insure integral union of the design with the base. The engraved plate or die having its lines filled with molding mixture is then pressed against it in the usual manner and the result is a raised design or lettering on the backing, integral therewith, and corresponding to the engraving on the plate. The curing is completed to the extent desired by sufficient application of heat during this pressing operation.

2. This same result may be accomplished by printing the desired lettering or design upon the copper sheet. This printing may be done with a reactive

(*Continued on page 282*)

The World's Recent Progress in Synthetic Resins

A complete and condensed account of patents from the most important industrial countries

By Dr. Aladin

The patents that are listed here are all of recent origin and disclose the progress realized throughout the civilized world in this field. The dates, except in case of U. S. patents, are those of application. There will be a total of over 450 patents in this review. Publication began in April, 1929.

(Continued from March Issue)

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
290	Ger. Pat. 443,454	M. Luther and E. Hochheim (I. G. Farbenindustrie A.-G.)	Method of carrying out chemical reactions in fluid media, or for the evaporation of liquids.	The amount of energy required to stir this liquid is measured. The process deals with the preparation of condensation products of formaldehyde and urea.
291	Ger. Pat. 446,998 Frdl. XV. 1119	F. Pollak (K. Ripper)	Preparation of condensation products from urea or its derivatives and formaldehyde.	Salts capable of splitting off free hydrogen ions, such as ammonium salts, are added to the water-soluble initial condensation products.
292	Ger. Pat. 448,201 Frdl. XV. 1161	F. Pollak (K. Ripper)	Preparation of insoluble condensation products.	During the preparation of condensation products of urea or its derivatives with formaldehyde, there are added to the fluid intermediate products such substances as will destroy hydrogen ions, preferably alkaline reacting substances such as sodium acetate, calcium chloride, etc.
293	Ger. Pat. 456,082 Frdl. XV. 1163	F. Pollak (K. Ripper)	Preparation of condensation products from urea or its derivatives, and formaldehyde.	In order to obtain water-clear products, one works with less than 3 mols of formaldehyde to one mol of urea; divides the condensing process into two stages by using two different acting catalysts, the first of which is free from free hydrogen ions.
294	Brit. P. 193,420	F. Pollak	Preparation of condensation products.	See Ger. P. 437,533 (No. 288).
295	Brit. P. 206,512	F. Pollak	Insoluble condensation products from urea or its derivatives and formaldehyde.	In order to avoid the acid reaction products that form during the initial steps in the condensation, even though alkaline condensing agents are used, and which causes the formation of cloudy or opaque products, suitable salts such as sodium chloride, potassium chloride, etc. are added. A substance that combines with the excess formaldehyde, such as urea is also added.
296	Brit. P. 213,567	F. Pollak	Preparation of condensation products from urea or its derivatives and formaldehyde.	See Ger. P. 456,082 (No. 293).
297	Brit. P. 238,904	F. Pollak	Preparation of fluid, semi-solid or solid condensation products from urea and its derivatives, and formaldehyde.	See Austrian P. 107,429 (No. 359).
298	Brit. P. 240,840	F. Pollak	Methods for further working up of condensation products of urea and formaldehyde.	See Austrian P. 107,427 (No. 358).
299	Brit P. 246,126	Society for Chemical Industry	Preparation of urea-formaldehyde condensation products.	See U. S. P. 1,674,199 (No. 282).

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
300	Brit. P. 246,127	Society for Chemical Industry	Preparation of urea-formaldehyde condensation products.	See U. S. P. 1,679,246 (No. 285).
301	Brit. P. 248,477	E. C. Rossiter British Cyanides Co. Ltd.	Preparation of artificial resins from thio-urea and formaldehyde.	The condensation is effected by blowing heated air into the mixture of the components at a temperature below 100° C. during the evaporation in order to remove the free formic acid that forms in the reaction.
302	Brit. P. 248,729	F. Pollak	Preparation of hydrophobe resins by the condensation of urea or its derivatives with aldehydes such as formaldehyde.	See Austrian P. 103,910 (No. 355).
303	Brit. P. 249,101	Society for Chemical Industry	Preparation of condensation products from urea and its derivatives and formaldehyde.	See Swiss P. 117,170 (No. 364).
304	Brit. P. 256,248	Rohm & Haas Co.	Preparation of condensation products from urea and formaldehyde.	See U. S. P. 1,633,337 (No. 275).
305	Brit. P. 256,711	Damard Lacquer Co. Ltd. and W. F. Fleet and H. V. Potter	Preparation of an artificial resin from urea, phenols and formaldehyde.	The reaction is carried on either in the presence or absence of condensing agents by heating the mixture under a reflux condenser, the water being afterwards boiled off and the mass hardened at 250° C.
306	Brit. P. 258,289	I. G. Farbenindustrie A.-G.	Preparation of a condensation product from urea and formaldehyde.	See Swiss P. 125,010 (No. 372).
307	Brit. P. 260,288	Society for Chemical Industry	Preparation of condensation products from urea and its derivatives and acrolein.	Acrolein or one of its polymerization products such as diarcryl or an acrolein resin is allowed to react with urea or one of its derivatives such as thiourea in either a closed or open vessel, and in absence or presence of catalysts, solvents or diluents.
308	Brit. P. 261,029	I. G. Farbenindustrie A.-G.	Preparation of condensation products from formaldehyde and urea.	Dimethylolurea is dissolved in an organic non-aqueous solvent and condensed with phenol by aid of an acid catalyst. Fillers may also be added if desired.
309	Brit. P. 261,409	Kunstharzfabrik Dr. F. Pollak G.m.b.H.	Preparation of porous artificial masses.	See French P. 624,441 (No. 342).
310	Brit. P. 262,148	G. Walter	Preparation of lacquer resins and water insoluble masses.	Dimethylolurea or thiourea, if desired in the presence also of about 10% of an amido compound such as urea, thiourea, acetamide etc., is heated with small amounts of an acid of the type of acetic acid or chloroacetic acid to about 120-140° C., the heating being swiftly carried to this temperature. A solvent such as benzyl alcohol may also be used to facilitate the reaction. The resins obtained are suitable for use in lacquers.
311	Brit. P. 266,028	British Cyanides Co., Ltd. (E. C. Rossiter)	Preparation of artificial resins from urea, thiourea and formaldehyde.	The condensation of thiourea with formaldehyde is accelerated by the addition of urea. By blowing dry air into the reacting mixture the formic acid that forms is continuously removed. If the addition of urea does not exceed 25% then clear products will result.

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
312	Brit. P. 266,389	F. Pollak	Methods for the further treatment of condensation products of urea and its derivatives and aldehyde.	See Austrian Patent 107,427 (No. 358).
313	Brit. P. 266,752	I. G. Farbenindustrie A.-G.	Manufacture of urea-formaldehyde condensation products.	Dimethylolurea while dissolved in an organic solvent such as methyl or ethyl alcohol is treated mildly with slightly acid condensing agents.
314	Brit. P. 271,037	Kunstharzfabrik Dr. F. Pollak	Preparation of artificial masses from urea or its derivatives and formaldehyde.	See French P. 6[illegible],318. (No. 347).
315	Brit. P. 271,264	Heinrich Traun & Söhne, vormals Harburger Gummikamm Co.	Preparation of urea-formaldehyde condensation products.	See French P. 618,991. (No. 338).
316	Brit. P. 281,717	Society for Chemical Industry	Preparation of urea-formaldehyde condensation products.	The condensation is effected in the presence of catalysts such as acids (sulfuric acid) or salts (such as ammonium thiocyanate, which are afterwards removed from the product by washing. Softening agents such as triaryl-phosphates, phthalic acid esters and fillers and further resin forming substances such as wood flour, phenols and amines may be added.
317	Brit. P. 281,993	F. Schmidt	Preparation of plastic masses from urea-formaldehyde condensation products.	Casein is moistened and mixed with ethylenechlorohydrin, urea and ethylurethane (or para-toluenesulfonamide or phenol. Formaldehyde is then added and the mixture is kneaded in a vacuum at between 40 and 50° C.
318	Brit. P. 284,272	G. Walter	Preparation of methylolurea.	Urea or thiourea or their derivatives are treated while dissolved in an organic solvent with equivalent amounts of formaldehyde in the presence of a small amount of alkalies.
319	Brit. P. 287,177	K. Ripper	Preparation of an artificial resin from dicyandiamide and formaldehyde.	For example one mol of dicyandiamide is condensed with 1 mol of formaldehyde in aqueous solution; or 1 mol of dicyandiamide, with 1 mol of urea, thiourea, phenol or cresol plus 2 mols of formaldehyde.
320	Brit. P. 287,568	K. Ripper	Preparation of artificial masses.	Substitutes for glass or porcelain, insulating material and molded products are obtained by condensation of urea and thiourea with aldehydes, particularly formaldehyde and its polymers. Suitable fillers are also employed. Methylolurea orthiourea may also serve as the raw materials.
321	Brit. P. 288,346	I. G. Farbenindustrie A.-G.	Preparation of formaldehyde-urea condensation products.	One mol of urea is condensed with 1.5—2 mols of formaldehyde in a slightly acid aqueous solution, the water being afterwards removed at temperatures below 50° C.
322	Brit. P. 291,366	Kunstharzfabrik Dr. F. Pollak	Preparation of artificial resins.	Urea, thiourea or their derivatives are condensed with aldehydes such as formaldehyde. The addition of acids accelerates the formation of a gel. The water is then removed in vacuum at a low temperature. The resultant product is then sprayed into heated air thereby it is converted into a powder. Any formaldehyde still present is removed by means of ammonia.

(Continued on page 269)

Serial No.	Patent Number and Date	Inventor or Assignee	Title of Invention	Subject Matter of Invention
323	Brit. P. 291,712	G. Walter	Methylol-amino-compounds.	Acid-amides such as acetamide are condensed in slightly alkaline solution with an equivalent amount of formaldehyde.
324	Brit. P. 292,595	I. G. Farbenindustrie	Preparation of condensation products from urea and alcohols or ketones with formaldehyde.	The condensation product obtained in accordance with Brit. P. 278,390 (No. 480) from butyleneglycol and urea, is treated with formaldehyde to condense the two products.
325	Brit. P. 293,872	N. Kappeler	Preparation of urea-furfural condensation products.	Equivalent amounts of the components are condensed in presence or absence of condensing agents, or in the presence of other aldehyde, with or without the addition of fillers.
326	Brit. P. 294,253	E. G. Budd Mfg. Co. (L. Smidth and Luco Products Corp)	Preparation of urea-formaldehyde condensation products.	Slightly acid formaldehyde solutions are condensed at 25 to 50° C with urea, the solution being then concentrated at the same low temperature. Thiourea may also be then added, and the concentration continued under vacuum, the temperature being gradually raised first to 100° C. and then to 200° C. The resultant mass is then poured into forms and heated therein to between 70 and 95° C.
327	Brit. P. 294,254	E. G. Budd Mfg. Co. (L. Smidth and Luco Products Corp)	Preparation of urea-formaldehyde condensation products.	The intermediate product obtained in accordance with Brit. P. 294,253 (No. 326) is condensed in an acid medium with thiourea.
328	French P. 542,971	F. Pollak	Hard, insoluble condensation products.	See U. S. P. 1,458,543. (No. 273).
329	French P. 562,320	F. Pollak	Preparation of condensation products.	See German P. 437,533. (No. 288).
330	French P. 602,318	F. Pollak	Preparation of fluid semi-solid or solid condensation products from urea, its derivatives or substances yielding urea, and aldehyde.	See Austrian P. 107,429. (No. 359).
331	French P. 603,625	Societe Industrielle des Matières Plastiques (H. Barthelemy)	Preparation of urea-formaldehyde condensation products.	The condensation of the components is carried out without heating by adding magnesium or other alkaline-earth carbonates. The resultant syrupy mass is treated with a strong acid such as hydrochloric acid and heated. At about 90° C. the mass will set and form a clear, hard, transparent, light—and heat resistant product.
332	French P. 603,875	F. Pollak	Methods of further treatment of urea-formaldehyde products.	See Austrian P. 107,427. (No. 358).
333	French P. 611,271	Society for Chemical Industry	Preparation of urea-formaldehyde condensation products.	See Swiss P. 177,170. (No. 364).
334	French P. 611,973	F. Pollak	Preparation of hydrophile resins by condensation of urea or its derivatives with aldehyde (formaldehyde).	See Austrian P. 103,910. (No. 355).
335	French P. 615,346	Society Industrielle des Matierés Plastiques	Preparation of urea-formaldehyde condensation products.	The polymerization of the initial condensation product is carried on simultaneously with the hardening by the addition of organic acid anhydrides such as benzoic anhydride, acetic anhydride etc. Additional substances added are sodium phosphate, sodium acetate and sodium glycocollate.

336	French P. 616,048	Damard Lacquer Co. Ltd.	Preparation of synthetic resins.	See Canadian P. 265,519. (No. 287).
337	French P. 616,495	Society for Chemical Industry	Preparation of urea formaldehyde condensation products.	See Swiss P. 118,725. (No. 366).
338	French P. 618,991	Heinrich Traun & Söhne, vormals Harburger Gummikamm Co.	Preparation of urea-formaldehyde condensation products.	For example: 504 parts of para formaldehyde are placed in 200 to 400 parts of water and 100 parts of 7% ammonium hydroxide and 480 parts of urea are added. The mixture is boiled for ten minutes and then poured into forms.
339	French P. 619,342	Rohm & Haas	Preparation of urea-formaldehyde condensation products.	See U. S. P. 1,633,337. (No. 275).
340	French P. 623,087	Society for Chemical Industry	Preparation of condensation products from urea or its derivatives and acrolein.	See British P. 260,288. (No. 307).

The present total number of these patent digests is 495. We will reproduce from 30 to 50 of these in every issue until the review is completed. The patents reviewed cover the last four years only. For earlier similar reviews see our German contemporary KUNSTSTOFFE, from 1924 to 1928, where a similar review by the same author was published. If there is a sufficient demand from our readers, we shall, on completion of this series, reproduce the entire set in bound book form. Announcements as to whether this will be done will be published in due time.

American Cellulose Acetate Plastics

A Review Covering One Hundred and Seventeen Patented Methods and Products in This Art

By Joseph Rossman

THIS review is directly continued from page 217 of the March issue. The patents reviewed have been given serial numbers for convenience in reference.

71. Lindsay 1,319,229. Oct. 21, 1919.

The process consists in combining an acetyl cellulose and phenylsalicylate by the use of a solvent mixture comprising dichlorhydrin and a solvent for the acetyl cellulose and the phenylsalicylate.

72. Dreyfus 1,325,931. Dec. 23, 1919.

A plasticizing agent is added to cellulose acetate, the amount of such plasticizing agent being the greater, the greater the viscosity of the cellulose acetate used.

73. Levey 1,330,543. Feb. 10, 1920.

A composition of cellulose acetate soluble in ethyl butyrate and pyridin and insoluble in benzin, carbon tetrachlorid and ethyl alcohol.

74. Seel 1,342,601. June 8, 1920.

Cellulose acetate combined with a chlorin substitution product of naphthalene, acetone, and butyl alcohol.

75. Seel, 1,342,603. June 8, 1920.

A composition comprising acetone 300 to 500 parts, cellulose acetate 100 parts and ethyl propionate 1 to 200 parts.

76. Jarvis 1,343,135. June 8, 1920.

75 parts of cellulose acetate is mixed with 25 parts of naphthalene and 60 parts of acetone.

77. Jarvis 1,349,156. Aug. 10, 1920.

Acetyl cellulose in combination with acetone cinchonine and its salts.

78. Dreyfus 1,353,384. Sept. 21, 1920.

A composition containing cellulose acetate, and containing a high-boiling mixture of isomeric xylene now-carbon-akyl sulfonamids which mixture is liquid at ordinary temperature.

79. Dreyfus 1,353,385. Sept. 21, 1920.

Cellulose acetate containing a high-boiling mixture comprising ortho- and paratoluene low-carbon-alkyl sulfonamids.

80. Jarvis 1,354,401. Sept. 28, 1920.

A composition consisting of nitro-cellulose and acetyl-cellulose, to which is added an acetone collodion and chloral hydrate with cinchonin.

81. Carroll 1,354,726. Oct. 5, 1920.

Cellulose nitrate, cellulose acetate, tetra chlor naphthalene

and a phenyl ester for keeping the tetra chlor naphthalene in the colloidized state.

82. Miles 1,357,335. Nov. 2, 1920.

Cellulose ester composition, consisting of cellulose acetate and the aggregate of fatty acids extractable from cocoanut oil.

83. Clarke 1,370,879. Mar. 8, 1921.

A composition of matter comprising cellulose acetate, a simple dialkyl sulfone and a solvent common to both.

84. Lindsay 1,386,576. Aug. 2, 1921.

The process consists in combining acetyl cellulose, tricresylphosphate and urea by the use of dichlorhydrin and a solvent of the acetyl cellulose and tricresylphosphate.

85. Lindsay 1,388,472. Aug. 23, 1921.

A composition containing an acetyl cellulose soluble in acetone, borneol and a miscible medium comprising a chlorinated hydrocarbon alcohol solvent.

86. Miles 1,394,752. Oct. 25, 1921.

The method of producing a cellulose acetate uniformly impregnated with a small percentage of glycerin, consists in first heating cellulose acetate in admixture with an abundance of glycerin, then eliminating the glycerin by washing with water, then mixing the washed cellulose acetate with a glycerin-water mixture, and finally eliminating the water by evaporation.

87. Dreyfus 1,395,401. Nov. 1, 1921.

A composition containing acetate and ketohexamethylene.

88. Clarke 1,398,939. Nov. 29, 1921.

Cellulose acetate is combined with phenyl phthalate.

90. Scheele 1,408,035. Feb. 28, 1921.

Acetone-soluble cellulose acetate combined with ethyl butyrate and acetone.

90. Ccheele 1,408,035. Feb. 28, 1922.

A solution comprising copal and cellulose acetate dissolved in ethyl-methyl-ketone.

91. Kessler 1,408,095. Feb. 28, 1922.

A composition having cellulose acetate, triphenyl phosphate, urea and methyl-acetyl-salicylate.

92. Eichengrun 1,420,028. June 20, 1922.

100 parts of acetyl cellulose soluble in chloroform are kneaded together in a kneading apparatus with 100 parts of alcohol, 50 parts of glacial acetic acid and 35 parts manol (acetyl-methyl-aniline) and brought to a temperature of 60 to 70° C. until a uniform swelling of the mass is obtained and a part of the alcohol is evaporated. The mass is then worked in a manner usually for ordinary celluloid.

93. Dreyfus 1,440,006. Dec. 26, 1922.

A plastic mass consisting of:

	Parts
Cellulose acetate	100
Cycyobutanone	50
Methyl acetate, acetone or alcohol	100
Triphenylphosphate	12-15

94. Stevenson 1,458,505. June 12, 1923.

A non-inflammable film consisting of acetyl cellulose and equal amounts of triacetine and triphenylphosphate in the proportion of from 10 to 30% of the weight of acetyl cellulose.

95. St. John 1,462,306. July 17, 1923.

A plasticiser, mixed cresyl-phenylphosphate, liquid at normal temperature and pressure.

96. Dreyfus 1,466,819. Sept. 4, 1923.

A plastic made from:

	Parts
Cellulose acetate	100
Mixed isomeric xylene mono-ethyl or mono-methyl sulphonamides according to U. S. patent 1,353,384	30
Ethyl or methyl alcohol or mixtures thereof	200

97. Forse, Jones and Walters 1,468,609. Sept. 18, 1923.

A record material in granular form including celluose acetate, an acaroid resin, and a filler.

98. Lindsay 1,493,209. May 6, 1924.

A thermo plastic composition comprising acetyl cellulose plasticized by an aromatic phosphate in a mixture with sufficient calcium sulphate to produce a fire retarding effect.

99. Lindsay 1,493,210. May 6, 1924.

A composition containing cellulose acetate, a plasticizer therefor containing an aromatic phosphate and a fire retarding ingredient comprising calcium tartrate.

100. Dreyfus 1,501,206. July 15, 1924.

Cellulose acetate combined with a plasticising agent comprising benzene alkyl sulfonamid, which is liquid at ordinary room temperature and which further is a jelly at temperatures somewhat below 0° C.

101. Dreyfus 1,508,928. Sept. 16, 1924.

Cellulose acetate and a toluene dialkyl sulfonamide preparation which is liquid at ordinary temperature and forms a jelly at low temperatures.

102. Herrmann 1,510,779. Oct. 7, 1924.

The process for production of an ungelatinized pressed mass, comprises submitting a compound of cellulose with an organic substance mixed with material including filling substances, in a finely disintegrated state, to heavy pressure at a high temperature and mechanically disintegrating the pressed mass.

103. Fausten 1,512,751. Oct. 21, 1924.

The process for producing non-inflammable celluloid-like products consists in adding to gelatinized acetyl-cellulose an amount not exceeding five per-cent of nitro-cellulose.

104. Dreyfus 1,528,291. Mar. 3, 1925.

100 parts of finely ground cellulose acetate are worked up in a kneading apparatus with about 30 to 40 parts of mixed isomeric xylene-o-monomethyl sulphonamides (U. S. Patent No. 1,353,384), with or without addition of about 6 to 8 parts of triphenylphosphate or tricresyl-

phosphate, the mass being gradually heated to about 100-150° during the kneading operation, to melt the cellulose acetate together with the plasticizing material.

105. Dreyfus 1,530,987. Mar. 24, 1925.

A composition comprising cellulose acetate and a plasticising agent comprising a mixture of isomeric diethyl sulfonamides, which mixture is liquid at ordinary room temperature and is a jelly at temperatures somewhat below 0° C.

106. Lindsay 1,538,862. May 19, 1925.

A thermoplastic mass consisting of 100 parts acetyl cellulose, 15 to 30 parts liquid tricresylphosphate, 10 to 40 parts cerium oxalate.

107. Clancy 1,544,809. July 7, 1925.

The process comprises treating cellulose acetate with liquid anhydrous ammonia to dissolve the cellulose acetate, and then removing the excess ammonia with exclusion of moisture.

108. Clancy 1,544,810. July 7, 1925.

The process of subjecting cellulose acetate to the action of liquid sulfur dioxid, and then removing the sulfur dioxid therefrom at a pressure less than that at which the treatment was effected and with exclusion of moisture.

109. Jones 1,558,175. Oct. 20, 1925.

A phonographic record made from: Cellulose acetate 30%, gelatinizer 15%, acroid resin 5%, barytes 20%, silica 26%, and vegetable black 4%.

110. Carroll 1,560,542. Nov. 10, 1925.

A composition comprising cellulose acetate and cresyl p-toluene sulfonate, the weight of the latter being less than the weight of the former.

111. Carroll 1,572,232. Feb. 9, 1926.

A transparent film comprising cellulose acetate and sufficient tributyrin to maintain flexibility therein after prolonged heating at 65° C.

112. Malone and Carroll 1,575,778. Mar. 9, 1926.

A composition comprising acetone-soluble cellulose acetate 100 parts, acetone 300 parts, castor oil 4 parts, and acetylene tetrachlorid 40 parts.

113. Dreyfus 1,595,506. Aug. 10, 1926.

100 parts of cellulose acetate in powder are mixed with about 45-55 parts of paratoluene sulphonamide or other plasticizing agent and the mixture is melted together in a heated pot. The molten mass is then run into slabs or sheets which are ground to powder and mixed with about 180-200 parts of powdered filling material, for instance a mixture of lampblack, red oxid of iron and barytes. The mixture of ground material and filling material, preferably after working up or kneading on heated rolls, can be molded or pressed under heat into matrices or molds to form gramophone or phonograph records or other molded or pressed articles.

114. Dreyfus 1,611,169. Dec. 21, 1926.

Cellulose acetate, having zinc chlorid incorporated in its body and such water as the zinc chlorid absorbs and retains.

115. Zelger 1,685,443. Sept. 25, 1928.

A plastic consisting of a mixture of acetylcellulose with monoethyl-diphenyl phosphate.

116. Zelger 1,685,444. Sept. 25, 1928.

A plastic compound comprising a mixture of acetylcellulose with phosphoric esters containing both aliphatic radicals and halogenated aromatic radicals.

117. Roland 1,713,482. May 14, 1929.

A composition consisting of the following ingredients: acetyl cellulose, alcohol, chlorbenzol, tetrachlorethane, benzyl benzoate, triacetine, and dichlorhydrin.

Celluloid that Sticks to Paper

IN order to provide transparent celluloid tabs that can be applied to the margins of telephone books etc. by the mere moistening of the back of the tabs and sticking them to the pages like a stamp, Carl F. Brenne adopts a scheme in which the celluloid is first given a coating of a varnish that slightly roughens the celluloid and then dries fast thereto. After the varnish is dry, he applies a flexible glue which has the property of readily adhering both to paper as well as to the varnish on the celluloid, thus making it possible to apply one to the other.

Simple as this may sound, and as obvious, yet one can patent such things. In fact, it seems as though nothing at all new can be brought out or described before somebody has first hastened to the patent offices of the world to protect themselves against the almost inevitable infringement. Though it takes many years, usually, to get a patent, it is usually well worth the trouble. Brenne obtained U. S. P. 1,745,977 for this invention on Feb. 4, 1930 (filed Jan. 28, 1925). The patent is controlled by the Phon-Book-Index Co., Inc., of Seattle, Washington. A suitable formula is as follows:

Flexible Glue Used

For the first coating, three to five parts of spirit varnish and one-half to two parts of amyl acetate; for the second coating, a flexible glue may be diluted with vinegar to the proper consistency so that it can be applied with a brush, and then a softening or corroding agent may be added, such as amyl acetate, to the extent of about one part to twenty parts of diluted glue. Too much amyl acetate involves the danger of dissolving the celluloid.

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Resinoid from Nitrobenzene and Sulfur

Cheap and easily procured raw materials can be condensed into a thermoplastic resin that readily lends itself to both cold and hot molding

TWO comparatively cheap and readily available raw materials are employed in the production of a synthetic resin suitable as a binder in plastics.

William C. Wilson, in his U. S. P. 1,732,453, describes it. The invention is assigned to Cutler-Hammer, Inc.

In accordance with this invention, nitro-benzol and sulphur are boiled together under a reflux condenser; sulphur dioxide is given off, and the mixture gradually thickens, forming a resin the melting point of which depends upon the amount of sulphur which combines with the nitrobenzol. By varying the relative proportions of the sulphur and nitrobenzol and the duration of the refluxing operation, resins of a wide range of melting points can be obtained.

Cold Molding

In all of the resins as initially prepared free nitrobenzol is present; whereas for cold molding this substance is allowed to remain in the resin (except when furfural is employed as hereinafter described), inasmuch as it acts as a solvent and facilitates mixing with an impregnation of the fibrous filler, such as asbestos. A low melting point resin is used for cold molding. For hot molding, the free nitrobenzol and other volatile substances are largely removed by treatment, preferably under conditions which permit their recovery. High melting point resins are thus obtained which can be mixed with suitable filler material and then hot molded.

A resin suitable for cold molding may be produced by placing about 369 parts of nitrobenzol and 160 parts of sulphur is a vessel provided with a suitable condenser and also preferably provided with a mechanical stirrer. The mixture is refluxed for a period of from five to seven hours with stirring, and the reaction product is a soft resin. A molding compound may be prepared by mixing 26 parts of the resin with 74 parts of asbestos in a kneading machine or other similar type of mixer. After mixing the material is disintegrated and screened to pass a 10-mesh sieve. The articles are then cold molded, and after removal from the die they are cured by heating, say, four hours at 175 degrees F., five hours at 225 degrees F., six hours at 300 degrees F. and five hours at 350 degrees F.

The relative proportions of nitrobenzol and sulphur may be widely varied in the production of both hot molding and cold molding resins. Thus, a cold molding resins results when using 369 parts of nitrobenzol with a quantity of sulphur varying from 128 to 224 parts.

Furfural Also Used

The strength of the aforedescribed resins may be increased by the addition thereto of a quantity of furfural. In this case, however, it is preferred to evaporate off the free nitrobenzol before adding the furfural. The increased strength is probably due to a reaction of the nitrobenzol sulphur resin with the furfural. To prepare a molding compound of this type, a mixture of 600 parts of nitrobenzol and 300 parts of sulphur is refluxed for a period of four and one-half hours, thus producing a soft resin. 130 parts of the resin are then mixed with 350 parts of asbestos in a kneading machine. The excess or free nitrobenzol is evaporated and 50 parts of furfural are added and intimately mixed with the resin. This mixture is then molded into the desired shapes, and the formed articles are cured by heating the same, preferably one hour at 300 degrees F., one hour at 350 degrees F., one hour at 450 degrees F. The molded at 45 degrees F. The molded and heat treated articles will have from ten to thirty per cent greater strength than they would have without the use of furfural.

Hot Molding

For hot molding purposes it is desirable to have a resin melting at 200 degrees F. or higher, and which gives off little or no volatile material on heating. In hot molding either one of two methods of procedure may be employed. In one case the molding compound may be in the form of a sheet, and is molded according to the so-called shellac method, in which the molding compound and the die are heated externally on a hot plate, and the compound then molded and cooled under pressure. A resin for this purpose may be produced by refluxing about 307 parts of nitrobenzol with from 256 to 480 parts of sulphur for a period of from four to six hours, and then heating the resinous reaction product in the open for about one-half hour to remove any excess of nitrobenzol. The melting point of the resin thus produced is about 250 degrees F. The molding compound is made by mixing on differential rolls about 360 parts of the resin, 370 parts of sienna, and 30 parts of cotton flock.

Thermoplastic Composition From Casein and Leather

Leather treated with sulphuric acid yields a gum that when combined with casein produces a useful plastic composition

MR. Peter C. Christensen, of the Aladdinite Company, has invented a new type of thermoplastic material derived from casein in admixture with what he calls "leather gum". This material is made as follows:

Leather, and preferably a mass of scrap leather because of its cheapness, is first immersed at ordinary room temperature in a dilute solution of a suitable acid such as sulphuric acid for the purpose of removing therefrom the oils, fats, glucose, glycerines and similar substances. Sulphuric acid solutions of various strengths may be used, it being preferable, however, to use a very weak solution such for example as anywhere from a ½% to 2% solution.

Sulphuric Acid Used

The leather is subjected to this treatment for a period of about 6 hours to 24 hours, this largely depending upon the strength of the sulphuric acid solution employed. The practically disintegrated leather or leather-like-substance resulting from such treatment is then boiled in water in an open vessel for a period of from about ½ hour to 3 hours, during which such substance, then consisting almost entirely of coherent fibrous materials freed from substantially all oils, fats, glucose, glycerine and similar substances which were present in the leather, is disintegrated and comminuted and settles in the form of a heavy brown gum. This gum is then preferably removed from the water and allowed to cool, whereupon it becomes a hard mass somewhat similar in appearance to rosin.

The casein plastics industry, while doing very well from a commercial point of view, is by no means as active in the line of patentable improvements. Yet it is the editor's belief that in the protein plastics there is ample room for research and improvement.

The hardened gum which is the "leather gum" referred to, is then ground to a granular or powdered form.

In producing the improved material any desired proportions of "leather gum", preferably, although not necessarily, in the powdered or granular form, and casein, also preferably in powdered form are mixed. Equal amounts of both materials are used. In mixing the "leather gum" and casein, sufficient water is added to produce a thick moist mass of powdered material, the best results being obtained by adding an amount of water which is from 25% to 50% of the weight of the "leather gum" and casein. This operation is preferably carried out in a mechanical mixer at ordinary room temperature and is continued until the materials become thoroughly mixed.

Masticating in Rolls

The thick moist mass of "leather gum" and casein is then preferably fed between heated masticating rolls for the purpose of obtaining a better and more uniform mixture of the materials. The masticating rolls are preferably maintained at a temperature of from about 130° to about 212°. In this operation the material adheres to the surface of the masticating rolls from which it is removed by scraping.

After the material has been passed through the masticating rolls, as described above, it may be made either into rods or tubes, as by employing extruding machines similar to those used in forming rods or tubes of hard rubber or celluloid, or it may be molded into any desired form in suitable moulds.

Molding

Where the material is molded, it is introduced same into rectangular moulds for the purpose of producing the material in the form of flat sheets or slabs. The molding operation is performed under heat and pressure suitable for producing compact and uniform sheets or slabs of the material, best results being attained by maintaining the moulds heated at a temperature of from about 130° to about 212° F., and by employing a molding pressure of from about 100 to 200 pounds per square inch. The material may also be molded into large blocks from which slabs of any desired thickness may be sliced, as is customary in the case of hard rubber.

Rods, tubes, sheets, etc., formed of the mixture of "leather gum" and casein, in the manner described above, become very hard upon cooling, substantially as hard as natural horn, but are quite brittle and if not further treated will crack

(*Continued on page 280*)

Technical Abstract Section

A Concise Review of Patents and Literature

Casein Plastics. Edwin Potter Carpenter, of Horley, England, assignor to American Machine & Foundry Company. U. S. P. 1,740,573; Dec. 24, 1929.

The process of making a plastic composition which consists in grinding commercial casein to a fineness of 60 mesh, adding water and hydrochloric acid to make a mixture of 20 gallons of water and 50 lbs. of casein having an acidity of 10 degrees, heating the mixture to 140 F. to cause the casein to mat together and form a homogeneous plastic material in a 20% to 100% solution of magnesium sulphate to remove impurities and cloudiness, drying the washed material at a temperature of 105 F., regrinding the dried material to a fineness of 90 mesh, spraying the reground material with 25 to 30 lbs. of water to 100 lbs. of casein and allowing the sprayed material to stand until the moisture penetrates to the centre of each granule of casein, and pressing the moist material and applying heat thereto during a part only of the pressing operation to consolidate the material and expel the moisture.

Battery-Box Mold. Robert Holz, of Cincinnati, O., assignor to the Richardson Company of Lockland, O. U. S. P. 1,742,473; Jan. 7, 1930.

A mold for battery boxes or the like comprising a female part, and a male part, having interspaced plungers, a stripper plate movable with relation to the male part and having depending webs to define the spaces around said plungers, and hence to define the top edges of the box formed in the female mold, said web portion having a cavity formed therein lying above the lower edge of said web portion, thereby providing for a handle projecting upwardly from the top edges of the box, and a metal re-inforcement applying device comprising means in the said web portion for retaining a metal piece so that same lies within the said cavity and projects downwardly within the space left between the plungers and the female mold below said web portions.

Process of Treating Shells for Making a Decorative Material. Alleetah H. Hilton, of Venice, Cal., assignor to Eva Alkire, of Long Beach, Cal. U. S. P. 1,744,634; Jan. 21, 1930.

Sea shells, in the form of large pieces or whole shells, are soaked for say 48 hours in a solution of citric acid, containing 2 ounces of the citric acid to a gallon of water. The amount of the solution should be sufficient to completely cover the shells. At the end of the period stated, the shells are separated from the remaining liquid, and are put into an oven and baked, for 8 minutes at a temperature of 475° F. The shells are then put into a lye solution consisting of 4 ounces of dry caustic soda to 1 gallon of water. The shells are allowed to soak for twenty-four hours in this solution, and are then removed from the solution and dried, the shells being then crushed and screened down to the desired size of particles. In the screening operation, it is advisable to discard the excessively fine material, whereas the material which is over-sized can be passed back to the crusher and again crushed down to pass through the coarser screen.

Built-up Sound Record. Edward Niethamer, of Bay City, Mich. U. S. P. 1.746,602; Feb. 11, 1930.

A talking machine record comprising a sheet metal disc having a centrally disposed opening, depressions in said disc, a washer having raised portions adapted to nest in said depressions, and a rim on said disc, having sound grooves formed therein.

Coating Composition Containing Cellulose Nitrate. Edward C. Haines, of Parlin, N. J., assignor to E. I. Du Pont de Nemours & Co., of Wilmington, Del. U. S. P. 1,744,699; Jan. 21, 1930.

In the application of a pyroxylin coat to a varnish-type under-coat to which the pyroxylin coat is normally substantially non-adherent, the step which comprises mixing with the under-coat, prior to the application of the pyroxylin coat, a modicum of nitro-cellulose which is insoluble in the under-coat.

Proteid Stencil Sheet. Armand de Waele, of London, Eng., assignor to D. Gestetner, Ltd., of London, Eng. U. S. P. 1,744,755; Jan. 29, 1930.

The stencil is coated with composition including the following ingredients in the proportions stated:

	Parts by weight
Sulphonated sperm oil	33
Trimethylene glycol ricinoleate	66
Distilled water	50
Titanium pigment	15
Bentonite or wilkinite	3

which is added to a dispersion of 14 parts by weight of gelatine in 200 to 300 parts by weight of distilled water with which it is thoroughly mixed. Sheets of yoshino paper are coated with this mixture in known manner and after the gelatinous composition has set the coated sheets are subjected to the action of formaldehyde vapour.

Brushing Lacquer. Stanley D. Shipley, of Stamford, Connecticut, assignor to Atlas Powder Company of Wilmington, Del. U. S. P. 1,744,085; Jan. 21, 1930.

A lacquer composition comprising the following ingredients, combined in substantially the proportions stated, viz:

	Per cent
Ethyl acetate	8
Camphor oil	1.5
Butyl acetate	20.5
Gasoline	37.5
Toluol	27.5
Resin solution	5

combined with nitrocellulose 3 ozs. per gallon.

Apparatus for Forming Plastic Bodies Upon Cores. John O. Goodwin, of Akron, O., assignor to the B. F. Goodrich Co., of New York, N. Y. U. S. P. 1,745,482; Feb. 4, 1930.

Apparatus for forming a cored article of plastic material, the said apparatus comprising an apertured extrusion block mounted in a fixed position and means for forcing a plastic material through said block, said block being formed freely to receive from an axial direction and thereby to engage and hold in fixed relation to each other the adjacent ends of a tubular mold and a core mounted therein.

Molding Mixture. Frank P. Brock, of of Hinsdale, Ill., assignor to Bakelite Corp., of New York, N. Y. U. S. P. 1.747,574; Feb. 18, 1930.

A sheeted molding mixture comprising a potentially reactive resin binder, a filler, and coloring material, and consisting of an extruded mass comprising a plurality of elongated bodies having various colors, said mass of bodies being extruded in the form of a sheet, said variously colored bodies being arranged approximately longitudinally in said extruded sheet.

Method of making a molding mixture comprising commingling a potentiallly reactive resin binder, a filler, and coloring material, the latter in the form of discrete particles, and extruding said mixture into an elongated preformed mass of variegated color without substantial reaction thereof, whereby a potentially reactive but predominantly unreacted molding mixture comprising a plurality of extruded bodies arranged approximately longitudinally of said extruded mass is obtained.

Apparatus for the Manufacture of Films from Cellulose Solutions. Heinrich Dethloff, of Maxau, Karlsruhe, Germany, assignor to Feld-

mühle Papier- un Zellstoffwerke Aktiengesellschaft, of Stettin, Germany. U. S. P. 1,748,868; Feb. 25, 1930.

An apparatus for manufacturing thin sheets or films from cellulose solutions, including a film producing device, a conveying band arranged to travel in a successively reversely inclined path and carrying the film, and a vat composed of a group of sections comprising relatively flat cases arranged in inclined juxtaposition and relatively closely embracing said band and the film carried thereby and substantially following the course of travel thereof, said cases being connected for intercommunication, whereby said film may be subjected to a liquid bath throughout substantially the full extent of its travel.

Esterification of Cellulose Materials. Birkett Wylam and John Thomas, of Grangemouth, Scotland, assignors to Scottish Dyes, Ltd., of Grangemouth, Stirling, Scotland. U. S. P. 1,748,689; Feb. 25, 1930.

Example I

This deals with the production of a cellulose acetate only slightly soluble in acetone, but readily soluble in chloroform. 15 parts of pyridine sulphuric anhydride are added to 30 parts of acetic anhydride, warmed to 100° C. On solution of the pyridine and sulphuric anhydride, 15 parts of cellulose in the form of filter paper are added. The mixture is stirred for about fifteen minutes, the temperature being maintained at about 100° C., and a homogeneous solution thus obtained. This is cooled, and added to water. Whereby a white amorphous powder is precipitated, containing up to about 56% of acetyl group. The product is only very slightly soluble in acetone but readily soluble in chloroform or pyridine.

Example II

According to this example, cellulose acetate soluble in acetone is produced. 15 parts of pyridine sulphuric anhydride, 20 parts of glacial acetic acid, and 10 parts of acetic anhydride are mixed, heated to 100° C., and 15 parts of paper cellulose added. The mixture kept at 100° C. is stirred for fifteen minutes, cooled, and poured into water as in Example I. The product is soluble in acetone, in which it yields viscous solutions.

Cellulose Acetate Record. L. Rutstein, U. S. P. 1,727,040; Sept. 3, 1929, assignor to Celanese Corporation.

A composition for phonograph records comprising a mixture of china clay, barytes, rotten stone and iron oxide, with a relatively small amount of lamp black as a coloring matter, and cotton flock as a binder, and from 25 to 50 percent of the weight of the finished mass of plastifying material consisting of cellulose acetate with alkyl-substituted carbocyclic sulfonamide plastifier therefor and shellac.

Sound Records and Resinoids

By Chas. W. Rivise

(*Continued from page 216 of the April issue*)

16. J. W. Aylsworth, 1,146,390, July 13, 1915, Filed Aug. 26, 1910.

A blank mold surface is painted with or dipped into a solution of a fusible soluble condensation product and a hardening agent such as hexamethylenetetramine in a suitable solvent which may be a volatile solvent as amyl alcohol, or a solid solvent such as mono-nithro-naphthalene, oil of mirbrane, di-nitro-benzol or other solvents. The coating upon the matrix may also be the enamel lacquer or varnish described in Patent 1,098,608. The coated blank mold is dried and then may be heated to infusibility after which a blank sound record made of a condensation product with or without an inert filler is pressed thereagainst with heat to cause a welding between the blank and the coating of the mold. The record blank is then removed and pressed against a heated record matrix. The plasticity component causes the infusible coating to soften sufficiently to receive the impression of the matrix.

17. J. W. Aylsworth, 1,146,391, July 13, 1915, Filed Aug. 26, 1910.

The body of the blank formed from a powder comprising wood flour and a phenol resin, is lacquered with some of the composition of which the veneer is to be made, dried and repressed at a lower pressure than the final pressure.

The hardened veneer may be formed upon a metallic plate as described in Patent 1,146,390 or it may be made from a lacquer comprising phenol, resin, naphthalene, a hardening agent such as hexamethylenetetramine and penta-chloro-phenol or other solvents described in Patent 1,046,-137 all dissolved in denaturated alcohol.

Some other possible materials are mentioned for the hardened veneers, some of which are non-phenolic and one of which is a varnish composition comprising a cellulose ester such as acetyl-cellulose and a phenol or cresol resin dissolved in acetylenetetrachloride, with or without the addition of a halogenized fatty acid or derivative and a small percentage of hexamethylenetetramine.

18. T. A. Edison, 1,146,413, July 13, 1915, Filed Dec. 20, 1911.

The method consists in placing in a mold a quantity of powdered stock, compressing the same by means of fluid pressure, evening off the surface and applying a veneer of record material thereto. The material for the base may be a mixture of wood pulp and a fusible condensation product such as the shellac substitutes or phenol resin. The surface veneer may preferably be applied as described in Patent 1,146,391. The veneer may be of phenol resin containing a hardening agent and a plasticity agent. The heating is preferably done in successive stages.

19. T. A. Edison, 1,146,414, July 13, 1915, Filed Jan. 20, 1912.

Both cylindrical and disk sound records are disclosed. Both forms of records have hard surface veneer or celluloid and an intermediate film of rubber. It is incidentally stated that the base of the disk record may be of phenolic condensation products such as described in Patents 1,046,137; 1,020,593 and 1,102,630.

20. W. A. Beatty, 1,158,964, Nov. 2, 1915, Filed Jan. 3, 1913.

Gum made from phenol and acetone in presence of an acid is dissolved in alcohol, ether, acetone, glacial acetic acid, amyl alcohol or acetate, acetylene tetrachloride or mixture of these to proper consistency and molded to proper shape. After impression is made the record is heated to harden, but same result may be obtained without heating if gum is first made acid in reaction. The last step is carried out at pressure less than atmospheric to get rid of solvent. The gum may be incorporated with fillers such as very finely divided graphite, wood powder, lamp black, steel dust made out of mixture of trinitro-cellulose and dioxy-diphenyl-dimethyl-methane dissolved in common solvent such as acetone and mixture may contain fillers.

21. J. W. Aylsworth and E. L. Aiken, 1,170,391, Feb. 1, 1916, Filed Aug. 6, 1910.

A phenol resin is dissolved in alcohol and a water solution of sufficient hexamethylenetetramine is added thereto. The above solution is then poured into a mixing machine and mixed with a filler such as dry wood pulp and a coloring material such as lamp black, the solvent being removed by evaporation. The dried mixture is molded to form the body of the blank, the hardening taking place to a limited extent.

The surface layer of the sound record blank is made by mixing dry hexamethylenetetramine with a plasticity agent such as chlorinated naphthalene as mono-chloro-naphthalene and heating to form a paste. Phenol resin is then ground and mixed in with the blank mixture, the hardening agent and plasticity agent and the mixture is sheeted between heated rolls. The blank together with one or two sheets of the surfacing mixture is passed between rolls and then molded together in a suitable mold to cure and consolidate the assembly.

Instead of wood pulp the filler may be a finely powdered infusible condensation product as described in Patents 1,102,631 and 1,146,388. Hexa is preferred as the hardening agent as stated in Patent 1,146,388 and 1,020,593 though paraformaldehyde may be used.

22. T. A. Edison, 1,201,448, Oct. 17, 1916, Filed Oct. 26, 1912.

Patentee discloses an apparatus for applying the record surface to a record blank. The apparatus consists of a turntable upon which is placed a record blank, means for applying a surfacing material such as a phenolic condensation product and having an outlet in proximity to the turntable and means for producing a relative feeding movement between the turntable and the supplying means so as to feed the surface material to the record blank in a spiral path from the center of the blank.

23. T. A. Edison, 1,207,383, Dec. 5, 1916, Filed Jan. 30, 1913.

The body of the record contains a fibrous filler such as wood flour and a binder such as phenol or cresol resin in the proportions of about one part of binder to three and a half parts of filler and has a veneer of final phenolic condensation product containing a plasticity ingredient such as penta-chloro-phenol. The veneer may be made of celluloid and the binder may be copal, gum, shellac, etc. The title of the record and the sound grooves may be impressed at the same time.

24. J. W. Aylsworth, 1,230,816, June 19, 1917, Filed March 8, 1911.

The record blank is made of ordinary shellac or shellac mixtures, colophony or a phenol resin as described in Patents 1,102,630 and 1,146,387 and a filler such as wood flour with or without a weighting material such as barium sulphate or metallic powders.

To form surface veneers for the blank, a loosely woven cotton cloth such as muslin, or a loose paper fabric such as filtering paper or Japanese rice paper and a blank of the unhardened condensation product are interposed between polished tin plates; moderate pressure and heat are applied and then the temperature is increased to harden the material. In case the condensation products described by Baekeland are used, the final hardening should be

done under pressure, but not if the compositions referred to in Patents 1,020,593; 1,046,137 and 1,102,630 are used. A variation is to coat the muslin on calender rolls, hardening the same on heated drums or in ovens and then punching out veneer blanks. The veneers may be of celluloid, cellulose acetate, casein or a mixture of a phenol resin, solid solvent and wood flour or cotton flocks. Two hardened surface veneers with an interposed blank are pressed together in a flash mold to unite the layers and to form the record impressions.

25. P. Poetschke, 1,274,324, July 30, 1918, Filed Nov. 12, 1917.

A cement consisting of a base of magnesium-oxychloride with any suitable filler such as silica, silex, powdered glass, powdered marble, chalk or clay and a solution of magnesium chloride is introduced between several sheets of fibrous material or paper, one or more of which sheets may be perforated and the assembly is allowed to harden with or without heat and/ or pressure. The top sheet before or after being assembled with the others may be treated with shellac, phenol-formaldehyde condensation product, wax or rosin or any combination of these and a further coating of the same kind may be applied thereto to receive the sound impressions. The intermediate coating may be omitted.

26. J. W. Aylsworth & E. L. Aiken, 1,282,011, Oct. 15, 1918. Filed June 19, 1912.

An engraved copper cut containing a reversed facsimile of the label impression is formed

(To be continued)

Leather Casein Plastics

(*Continued from page 274*)

and crumble upon exposure to the atmosphere. Accordingly the material is now treated so as to render the same very tough and non-brittle, preferably by properly curing the same. This is preferably accomplished by immersing the material in a solution of an aldehyde, and preferably a solution of formaldehyde, maintained at ordinary room temperature. The material is permitted to remain in a solution of formaldehyde until the same becomes thoroughly cured, the period necessary for

Some of its Uses

The material produced and treated as described above may be turned and machined into numerous forms of finished articles, such as those heretofore mentioned. The material is also sufficiently thermo-plastic so that it may be readily molded under heat into articles of various forms; the thermo-plasticity of the material being somewhat comparable to that of hard rubber. This improved material has all the desirable characteristics of synthetic horn or "galalith" and in many respects is superior in quality. It is a fine amorphous substance and very enduring, and it is considerably harder and will take a more brilliant polish than synthetic horn or "galalith", and is appreciably cheaper to manufacture than the latter.

Mr. Christensen invented this material four years ago, but only recently obtained a patent for it, namely February 4, 1930, No. 1,746,070. The patent does not show on its face that it has been assigned. It claims, for example,

A material comprising a mixture of "leather gum,, and casein.

A material comprising a mixture of substantially equal pro-

portions of "leather gum" and casein.

A hard amorphous material comprising a mixture of "leather gum" and casein, said material being toughened by treatment with an aldehyde.

Celluloid Tabs

(*Continued from page 273*)

Manifestly, a glue soluble in water at the time of attachment is preferable for general purposes, but for certain uses there are other adhesives which are not soluble in water and which involve having at hand a special preparation or agent for causing the sheet of celluloid supplied with said first coating to adhere. Such special preparations or agents might be a varnish, amyl acetate or acetone. These special agents would be applied by a brush at the time of attachment.

Roughening the Celluloid

The principle of the invention involving the process is thought to be as follows: The celluloid softening agent operates to roughen the upper portion of the sheet of celluloid, forming therein, as it were, pockets or teeth-like connections, so that the varnish is impregnated into the celluloid. Enough amyl acetate is provided to accomplish this softening effect in the upper portion of the celluloid sheet. This is to be contrasted with any process which completely dissolves the celluloid, so that the celluloid becomes a sort of cement. Likewise, the glue is preferably impregnated in the varnish coating by means of softening agent such as the amyl acetate. In other words, the glue coating will not adhere to the celluloid for the most general application of my invention, while the varnish will so adhere. But when the varnish becomes hard, it cannot be caused to adhere, by merely moistening, to the paper which is to be attached to the celluloid.

However, the glue may be impregnated in the first coating, i. e., in the varnish, and this glue when moistened at the time of attachment forms an intermediate bond between the article such as paper and the first coating, which in turn is bound to the celluloid sheet.

Molded Panels

(*Continued from page 261*)

phenol resin molding mixture or "ink" similar to that described above, and the copper may then be applied to the partially cured backing in the same manner.

3. The lettering or design may be printed upon an already impregnated fibrous sheet, with the same type of reactive phenol resin molding mix or ink. This sheet may be partially cured before the printing if desired. It is then backed and pressed in the usual manner.

Highly colored reactive phenol resin molding mivtures, or inks, of the type herein referred to, may be prepared by mixing metal powder or other suitably colored substance with sufficient reactive resin to form a binder.

Japanese Plastics

(*Concluded from page 261*)

of casein plastics was started a few years ago by the Dainippon Cellu-Co. Ltd. This concern also made some attempts to bring out a cellulose acetate plastic but has as yet not made a commercial success of the venture.

In synthetic resins there has been some development at Osaka, and at least one Japanese resin product has been brought out under the name of "*Sankyo*". The urea-formaldehyde resins are being investigated and a few patents have issued in Japan, mostly however to foreign inventors. Japanese industrial circles are now busy with what they term "rationalization", and the manufacturers of plastic goods are falling in line.

Thermoplastic Rubber

(*Continued from page 258*)

ties.) The final product possesses a higher degree of purity and has a lower moisture absorption, than the product as made from unpurified rubber.

Geer's patent 1,731,487 describes a composition called "fenolac" which is the reaction product of an intimate mixture of 7½ parts of p-phenol sulfonic acid and 100 parts of rubber, when heated in a compact mass from 4 to 10 hours at 250 to 290° F., the time of heating varying somewhat but in any event should be continued for about two hours following the peak of the pronounced exothermal reaction which takes place within the heated mass. The resulting fenolac is tough, leathery and non-friable and when washed and dried as in a vacuum drier, to remove excess acid and moisture, is found upon analysis to consist mainly of a hydrocarbon having hydrocarbon and carbon in the same ratio as in rubber and to be less unsaturated than rubber.

Non-tacky Products

The last composition, that of U. S. P. 1,731,488 is a thermoplastic substance.

The purpose of the last mentioned invention is to modify the heat-plastic rubber products in such a manner that they shall be free from surface tack and at the same time shall possess the characteristic property of being readily moldable at relatively low temperatures.

It was found that these heat-plastic rubber isomers when heated with as little as 15 per cent of sulfur become vulcanized, much in the same way as does rubber, to form a vulcanized rubber isomer. Vulcanization can be carried to a point where these vulcanized products are absolutely free of tack, but they are by this action made practically non-thermoplastic, that is, they possess a very high softening point. The heat plasticity may be resorted to these vulcanized products, and they may be changed to have a

relatively low softening point if they are melted and then solidified by cooling, and these solidified products may be made to be as free from tack as the vulcanized product before melting and consequently may be employed as a base for the manufacture of a wide variety of moldable articles.

Rubber Isomers

The vulcanized rubber isomer may be prepared in either of two ways: Either by preparing the rubber isomer and then incorporating therein sulfur and vulcanizing it, or initially incorporating the sulfur with the isomerizing agent in the rubber and combining the two reactions. The resulting products in either case have the same general appearance and when re-melted produce non-tacky readily thermoplastic materials having the same general characteristics.

Where the rubber isomer is first made, it is preferred to mix into 100 parts by weight of rubber, as on a rubber mill, an admixture comprising 8 parts of p-toluene sulfonic acid, 2 parts of concentrated sulfuric acid (specific gravity 1.82) and 2 parts of water, the latter being added to facilitate the mixing, and when the acids have been thoroughly dispersed through the rubber, the batch is heated as in a hot air oven maintained at 140° C., for eight hours. The resulting product is a hard, strong, thermoplastic material which breaks with a conchoidal fracture and which is readily moldable at relatively low temperatures.

Similar heat plastic isomeric conversion products of rubber may be prepared by employing in place of the admixed p-toluene sulfonic acid and sulphuric acid of the above example, other isomerizing agents of rubber, of which the following are given by way of example:

(a) organic sulfonyl chlorides, such as p-toluene sulfonyl chloride; or

(b) organic sulfonic acids, such as p-toluene sulfonic acid; or

(c) halides of amphoteric metals, such as ferric chloride.

Using Scrap Rubber

The use of vulcanized scrap rubber to form a plastic molding composition is described by Harold Gray in U. S. P. 1,745,926.

According to this invention, mix into 100 parts by weight of ground inner tube scrap, or similar vulcanized rubber containing a minor proportion of pigments, 20 parts of p-toluene sulfonyl chloride, and subject the rubber-acid mixture in a compact mass to heat for 8 hours at 140° C. Upon cooling, the product may be masticated and washed. The resulting product is hard, remoldable at relative low temperatures. The admixture of 10 to 20 parts of crude rubber, either with or without 10 to 20 parts of rosin, into the comminuted scrap of the above recipe facilitates the dispersion of the acid reagent therethrough and results in a vastly superior product, both as to homogeneity and ease of remolding. The latter product is readily mixed with pigments, fibers, softeners and colors.

MOLDED PRODUCTS

(Reg. U. S. Pat. Off.)

Devoted to the purchase, further use and merchandising of all manner of molded parts

Vol. 4 MAY, 1930 No. 5

Research and Foresight, and Co-operative Advertising of Molded Products

By H. S. Spencer

Advertising Manager, General Plastics, Inc.

REFLECTIONS on my visit with the Association's Meeting on advertising—that the art of custom molding needs advertising, I do not believe anyone will deny, and as Mr. Budd writes in Plastics for April, "A million dollars will do the job". Yes, well a million dollars will do a lot of things, and while a million dollars to many advertising agents and advertisers is only a means of making more millions, it must nevertheless be had, before it can be spent.

Having Adequate Funds

Somehow, it seems to me there is a lot to be done before money is spent for advertising.

I do not know, but if a definite budget is not set up by the Association, I believe it should be. Adequate funds should be raised whereby a very definite program could be carried on. The Molders Association should be an independent self supporting organization before it can do an intelligent advertising job. It must also be determined where it is most likely to secure business, and how, and plan to direct its sales efforts accordingly.

There is no doubt that Association advertising rightly conducted will prove beneficial. And looking back over the history of phenolic products, there are very few installations that have not been sold. I do not know of any that have been bought. First, the idea was sold. Greater heat resistance, strength, economy, durability, finish, etc. Then when the vogue for colors came, colors were sold and this brought the molders into novelties and an increased number of household products, and doubtless there will be many more of these, whether group advertising is done or not.

Five years ago, the molder did not think of molding the jobs that he is doing today. Today he is not aware of what he will mold in 1935. No one knows what these jobs of tomorrow will be, and no one will know without using their imaginations and better still, by doing an intelligent research job. For it is unlikely that those in the custom molding business would know what manufacturers in various lines of industry could use in the line of molded pieces, particularly in their product and less likely in their equipment to make this product. For instance, to whom would it occur that battery space bars could be molded unless they knew something about the manufacture of flash light batteries and the difficulties involved. Why a snake gun out of Durez in preference to metal, glass or other materials, and how many Easterners knew there was such a thing as a rattle snake gun; and so on through a long list. The point is how can we know the other fellow's problem; that the manufacturer of rayon for instance, is looking for a material for spinning buckets, a material more satisfactory than metal or porcelain. Of course, it is generally known today, but it was known to him years before the molding fraternity ever thought of it.

Creating New Outlets

There are also new devices. For instance automotive radio is looked to, to save the radio industry this summer. What are the problems of these manufacturers? To what extent could they use molding materials? Of course, the ideal way to tell them, is to go into the market place as Mr. Budd proposes. Go into the market place and display his wares, but unless this is preceded by a more definite organization and one involving not only the electrical industry alone, but in all phases of industry in the known fields and in the unknown ones and preceded by very definite research, much of the money can be wasted and comparatively little business secured.

There is no Aladdin's lamp

which the molding fraternity can rub and produce a lot of business quickly. Their's is a job involving a very thorough study of their markets and then proceeding along definite and the most intelligent lines of developing these markets—a system whereby inquiries resulting from the work will be systematically handled through the members of the Association, etc., must be arrived at. A headquarters where such work can center and be handled intelligently, must be established. The work can be undertaken on a comparatively small scale and gradually increased and it would seem that while this were the more conservative, it were the safer way for a young, inexperienced and not a wealthy Association to undertake it.

I am cautioning the Association against advertising before they are ready for it as spasmodic advertising is costly and non-productive. Anything short of a five year program, would not be worth while. We all know the wonderful success secured by prominent advertisers but if we will investigate their success, we will find that it was not secured in many instances, over night, that it has been the everlasting keeping at it and bringing up from a comparatively small beginning that has brought about their success.

Establishing Reputations

Studebaker made wagons by hand long before he made automobiles. Timken pounded out axles by hand before he made roller bearings. John Willys repaired bicycles and sold them before he built and sold automobiles. It took Mennen years to decide to go into a small advertising campaign and this finally against his will. The persistency of his advertising when he started, brought him through.

Circumstances, plus sufficient alertness to keep pace with the trend of the times and persistent advertising effort will carry any business ahead beyond the average. Add to these things, consistent and continuous advertising and the business becomes a leader, the outstanding business in its particular field. This principle should hold true with associations. Advertising will change the thought and actions of nations. It has made millions of men carry useless pocket lighters, the Chinese to chew gum, the nation's housewife to pick up the paint brush and go Duco-ing.

Campaign Must Be Lasting

I should like to see the molders undertake it, but only providing they do it on a permanent basis and after having first determining definitely, the definite objects which they wish to accomplish.

As I see these objects, they are about as follows: to get business, to establish their profession so that others will recognize that it is a highly specialized business and will hesitate to set up their own plants, recognizing that molding is something beyond mechanics. To establish the art of custom molding, to spread the knowledge that molding is a business in itself, one surrounded by technique and experience. That it is, in a sense, an art not to be attempted by the inexperienced. I believe that by broadcasting of such thought that the industry can be established as a permanent and important division of American industrial activity.

In doing so, the thought should be that the industry is not an activity of yesterday but one of today and essentially one of tomorrow, for more truly is tomorrow, the molders' day.

A Firm Place in Industry

Another thought should be the importance of making industry conscious of the fact that phenolic products will do many more jobs than they do today. Not by stealing away business from other industries but by creating business, making better products of greater marketability; and spreading the thought that the molder is not a competitor to fabricators of steel, the molder in porcelain or the worker in celluloid. Phenolic products are in competition with elementary forces, physical and chemical action, corrosion, electrical resistance, surface finishes, heat absorption; in short, molding materials are fitting into the scheme of things wherever the inherent qualities make these molded parts and objects suitable for greater service.

It would seem that there was a very definite and big job ahead of the molders as well as the raw material manufacturers, in developing new markets and that there was a real opportunity for them when we know that Gillette, making razor blades, maintain a Research Division to find out and work out other uses for Gillette blades than that of shaving. Certainly razor blades must be limited in their number of uses and very few as compared with the possibilities of molding compounds.

Celluloid Corp.

THE Celluloid Corp. has declared a participating dividend of $1.60 on the first participating preferred stock, payable June 2 to stock of record May 10. A year ago the company declared a participating dividend of $1.75.

German Flexible Gramophone Records

THE German Dye Cartel (I. G. Farbenindustrie) in cooperation with the Rhenish-Westphalian Explosives Co. (Rhenisch - Westfaelische Sprengstoff A.-G.) has succeeded in manufacturing a new raw material for gramophone records. The outstanding features of the new records are flexibility, light weight, and absolute proof against breakage. The weight of the new records is only one-seventh of that of shellac records, and the thickness only one-fifth.

Colorful Toys For The Eastertide Were Made of Du Pont Pyralin

THE Easter holidays are the jolliest of all days, bringing in their wake the glorious sunshine and the exuberant spirit of springtime. At this season Nature bedecks herself magnificently. "King Color" reigns supreme. Hence toys and playthings, to be most suitable for Easter, should be colorful, attractive and keyed to the occasion. To interest children, they must also be convincingly realistic.

To secure his quality of realism, the Du Pont Viscoloid Company at its Leominster, Massachusetts, factory uses du Pont Pyralin. The large variety of colors in which this product is made offers unlimited opportunities for unique and interesting color combinations. Moreover, the ease with which Pyralin can be fabricated, in comparison with other materials, and the quickness and permanence with which it takes shape and color make this product ideal, for manufacturing toys and novelties.

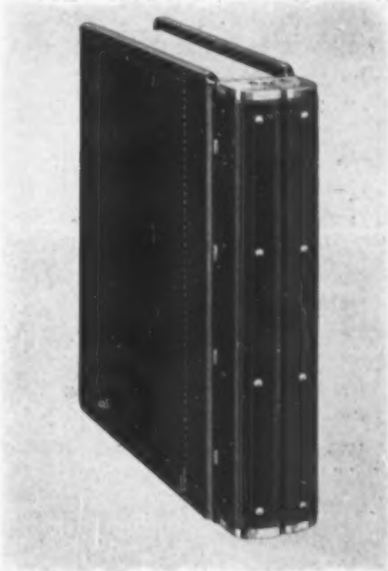
The method employed in making toys of the kind pictured on this page is known as the blowing process. Notice their exceptionally fine detail. The reason for it will be clear when you consider that two flat sheets of Pyralin are placed between heated dies, the shape of the finished toys, and subjected to tremendous pressure. Compressed air introduced between the sheets has the effect of distending the plastic substance to conform to the shape of the dies. Few materials known today can be shaped so easily into numerous novelty figures as du Pont Pyralin. It possesses wonderful working qualities.

All the Easter toys in the Pyralin line are in keeping with the time-honored traditions of the day and are in bright hues emblematic of springtime. They are unusually attractive playthings aside from their educational value.

New Applications of Bakelite Molded

DANGER from inflammable vapors in mines and refineries makes the design and choice of material used in the manufacture of trouble lamp housings of utmost importance. A complete molded resinoid job is found to be safest where contact with open wiring may cause ignition and explosion of gases. For the same reason, material which is a non-conductor of electricity is essential. Mechanical strength is another item of paramount importance. Incidentally, the design was improved when working with a phenol resinoid material instead of the steel wire formerly used as housing.

BINDERS for stockroom, shipping, and manufacturing department daily records not only receive continuous handling, but are subjected to extremes of temperature and humidity. To provide durable materials for the bookkeeping requirements of such departments, Wilson-Jones Company have developed a binder, with imitation leather covers and phenol resinoid back plates, which they are confident will witstand hard usage over a long period of time. Their choice of phenol resinold was influenced by the fact that this material is not affected by temperature and moisture variations, and has a permanent surface lustre which adds to appearance.



Aid To Consumers Is Keynote Of Molders' Meeting

Practises adopted to accomodate purchaser
Major Carson on Advertising

By R. C. Gilmore, Jr.
Plastics Publications, Inc.

THE Molded Insulation Section of the National Electrical Manufacturers Association held its third meeting of the year at the Statler Hotel, Buffalo, New York, on April first. The date may have been a coincidence. Considering the date, there were quite a few members present, twenty-one in all, representing sixteen member companies. These were:

American Insulator Corp.,
Prescott Huidekoper
Belden Mfg. Co., N. B. Parsons, L. L. Stratton
Boonton Rubber & Mfg. Co., R. W. Post
Bryant Electric Co., B. P. McKinley
Chicago Molded Products Corp., E. F. Bachner
Colt's Patent Firearms Mfg. Co., B. F. Conner
Diemolding Corporation, Donald Dew
General Electric Co., H. D. Randall, T. E. Giblin
Kurz-Kasch Co., C. A. Kurz, Jr.
Mack Molding Co., D. S. Kendall
Monowatt Electric Co., F. J. Groten, H. B. Zeiger
Northern Industrial Chem. Co., B. E. Schlesinger
Norton Labrotories, J. B. Neal, G. C. Wilson
Reynolds Spring Co., J. G. Rossiter, R. A. Austin
Scranton Button Co. (American Record Corp.), L. G. Sylvester
Shaw Insulator Co., F. H. Shaw

Others present were:

Stewart N. Clarkson, N.E.M.A.
R. C. Gilmore, Jr., Plastics Publications, Inc.
Hylton Swan, Bakelite Corporation
H. M. Dent, H. S. Spencer, General Plastics, Inc.
K. N. Atwater, Synthetic Plastics Corp.
Major Carson,
U. S. Chamber of Commerce
John R. Quigley, Accountant
Leonard Smidth, Aldur Corp.

The meeting began shortly before ten o'clock, and the minutes of the last meeting were read and approved. The work of Mr. Shaw and his Committee on uniform contract forms was approved by nineteen companies, more than the two-thirds required, and therefore adopted as a recommended practice of the association. This is to be noted as indicating considerable progress on the part of the section, since it will take definite steps to protect all buyers of molded articles. Only one change was made in the draft of this contract, the word "only", in the paragraph relating to the making of dies, was a typographical error and was removed. Copies may be secured from NEMA in New York.

Prize Fund to Entertainment

No disposition was made of the money remaining in the generic name prize fund, since two of the contributors could not be represented. Those present, however, indicated their willingness to present the balance due them to the entertainment fund of the section. Mr. Kurz, the Chairman, then called attention to water-marks, and Mr. Clarkson reported that he now had water-marks of forty-one companies, and would distribute blueprints shortly. A reproduction of all of these is given at the foot of this article.

Mr. Rossiter, in charge of the Association Advertising, gave a summary of his work to date with the figures on expenditures of eleven companies in 1929 and ten in 1930. He made several concrete suggestions, which were discussed in detail and, on motion of Mr. Randall, it was moved and carried that Mr. Rossiter submit a plan on Advertising at the earliest possible date.

Major Carson spoke on Association advertising. Major Carson has had wide experience in this connection, and talked most interestingly on the work of other associations, and read a number of telegrams from these groups telling how much they had benefitted from continued advertising. He gave the following figures on national advertising, explaining that these did not include newspaper work or supplementary advertising such as outdoor, direct mail, radio, etc.:

General Advertising
1918—$61,312,888
1923—121,259,212
1928—175,175,378
1929—197,072,296

Association Advertising
1918—$ 920,095
1923— 2,884,633
1928— 5,960,956
1929— 6,199,350

In 1923, 38 associations spent the money indicated, in 1928, 54 associations and in 1929, 60 associations.

Major Carson also stated that there were three requisites for successful advertising by any group:

I. A financial policy that will work fairly to all members and that would provide capital enough to do the work. 2. There should be a small committee with full power to carry out the policy of the Association. 3. Continued effort should be applied over a considerable period.

The discussion of Major Carson's remarks was carried over through the luncheon hour, Mr. Swann explaining some of the methods used by his company in their campaign. He offered the use of a two reel film showing both the molding and use of Bakelite. Mr. Gilmore stated that much more intelligent publicity should appear in the press, and told of the work being done by his organization to help bring this about.

Quigley on Cost Accounting

After the resumption of the business meeting, Mr. Quigley made a report on his work in gathering data for a uniform cost accounting method, stating that he had not had the replies to his questionaire that he needed. This was discussed at some length, and finally several of those present were persuaded to submit information. Mr. Wilson moved, and it was carried, that the molders give Mr. Quigley as much information as possible. It was also moved and carried that Mr. Quigley continue with his work, with the thanks of the Section.

The report of the Federal Trade Commission was then taken up, and Mr. Kurz requested Mr. Clarkson to read a letter from Judge Neagle commenting on the final decision of the section. Mr. Clarkson also said that if anybody present had not received a copy of the Commission's report that he would see they were supplied.

The question of publicity for the section was then taken up, and Mr. Gilmore explained that this type of work was doing a great service in informing the buyer of the many benefits to be derived from the work of the Association. He also stated that in almost every rule adopted, the purchaser was the prime consideration and benefitted more than the molder.

Next Meeting at Pittsfield

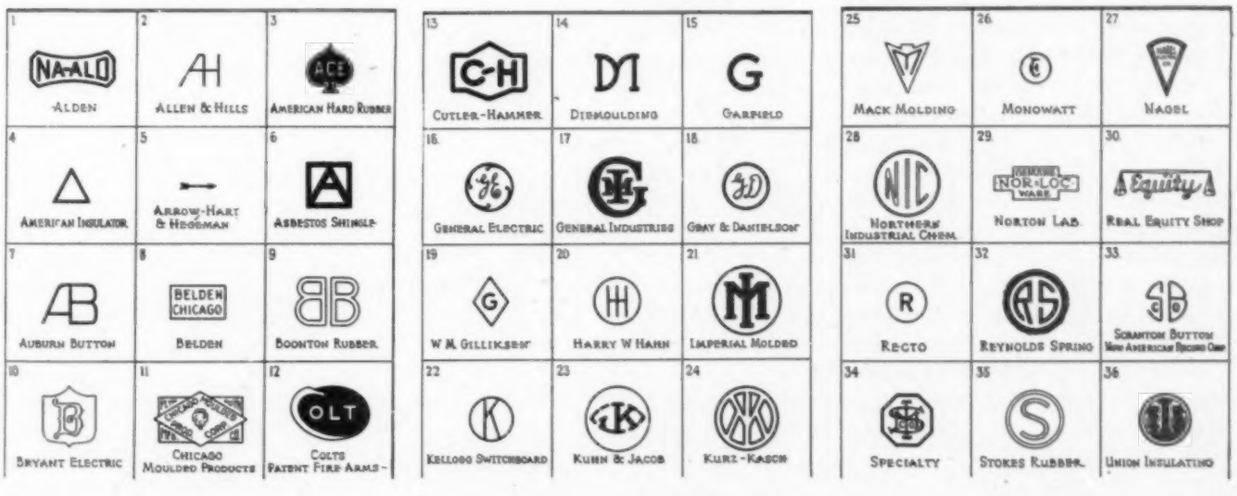
The date of the next meeting was placed sometime in June probably the 13th., at Pittsfield, Massachusetts. Mr. Parker and Mr. Randall will be hosts to the Section.

The meeting adjourned at five-thirty, and the majority of those present left in a chartered bus for the wilds of Canada where Mr. Neal and Mr. Spencer had provided the necessary ingredients for dinner and amusement. To repeat, this was in Canada. This dinner was a complete success, and with Mr. Rossiter acting as toastmaster practically everybody rose to speak once,—several spoke more than once. Mr. Smidth of the Aldur Corporation appeared just in time to join this part of the program. After a reading by Mr. Giblin, a tribute was paid to Mr. Kurz for his efforts as Chairman of the Section, and Mr. Kurz responded with a short talk dealing with the future of the group, its policies toward customers and a resume of the work in the past.

The faithful bus returned to Buffalo at nine o'clock, but was held up on the way by the loss of several hats which had been blown out of the open windows. Many of the members spent the night at the hotel, returning to business the next morning.

Monsanto Offers Maleic Acid

Announcement is being made by Monsanto Chemical Works, St. Louis, Missouri, of their production of Maleic Acids, which is now available to resin manufacturers and others interested in this product.



The Molded Insulation Section of NEMA has gathered the present collection of molders' watermarks. These include the marks of some non-members as well as members of the Section.

These watermarks have been adopted by the various molders for the protection of their customers. In purchasing molded products, look for the marks of a recognized molder.

The Ten Cent Product — Does It Mean Anything To You

By H. S. Spencer
Advertising Manager
General Plastics, Inc.

FACTS OF INTEREST ON THE TEN CENT MARKET

1. There is no price cutting on ten cent items.
2. The retailer gets full profit on every sale.
3. The ten cent market is always seeking new and colorful novelties and household items which it can sell in large volume.
4. There are over eleven thousand retail establishments in the ten cent market.
5. The buyers' credit and responsibility in most cases are excellent.

OF course, most of us habitually think of the ten cent article as being something cheap. It is thought of in connection with the nickle and dime store, and while this is the market place of ten cent items, it does not represent the entire outlet for ten cent articles, nor is it always the less expensive place to buy. The hardware dealer can prove this. Though it undoubtedly presents the greatest outlet for ten cent sales in existence. There are approximately 11,000 ten cent stores in the United States. These stores carry products of representative manufacturers. In the Woolworth stores for instance, we find the products of E. R. Squibb & Son—a house in its field of pharmaceuticals that assuredly is rated as a conservative, and representative of the highest type of business integrity.

We also find Colgate, Lambert Pharmacal Company, Kimberly Clark, Cheseborough Manufacturing, Metal Sponge Sales Company carrying the Good Housekeeping Institute approval, Lever Bros. Company represented by Lux and Rinso and the National Carbon Company as well as a lengthy list of other manufacturers of nationally known products—evidence that is rather convincing and disturbing to our thought of cheapness.

Eleven Thousand Outlets

The ten cent market place comprises 1850 Woolworth stores. 400 other chains operate a total of 9000 stores. These include the five and ten to one dollar stores. Then there are the druggists, the grocers and hardware stores maintaining ten cent counters or a table of ten cent items, a sales producer, and in the drug field, *Drug Topics* the past several weeks has published the statement that five thousand drug stores have ten cent tables, and that the tendency to the ten cent table among druggists has grown fast,—a considerable market place for ten cent items when it is recognized that there are sixty thousand druggists in the United States.

The ten cent market place is big. What does it mean to you as a molder, or to the manufacturer. What have you to sell in the ten cent market? What could you have to sell in this ten cent market?

What Can Be Sold

Where do molded products fit into the ten cent market place? What is being sold there?

A visit to any ten cent store will prove surprising, and unless you go often the succeeding visit will prove surprising in the additional number of items that you will find, involving molded products. In the electrical "department", there are wall plates, attachment plugs, two and three way outlet plugs, and in all, about a dozen different items. This is practically paralleled in their radio section.

A New Milk Bottle Opener, Ash Cups and Gear Shift Balls, Sell For Ten Cents.

Moving along through the store, you will find molded gear shift knobs, ash receptacles for automobiles, putty knives and screw drivers with molded handles, cigarette holders, poker chips and a hook or needle with a molded handle that is used to repair runs in silk stockings; a very attractive contrivance for getting paper tops out of milk bottles and forming a permanent top. In the drug section, or as the chain stores prefer to call their counters, Departments, we find twenty-two items that have Durez molded container tops or packaging parts. There are also beads, pendants and phonograph records.

What items could be sold here? It is difficult to conceive them all, and no one concern or individual is going to find all of

them. The ingenuity of the Thole Manufacturing Company in making the bottle stopper illustrated here, is not often duplicated, and while everyone has been pushing their thumbs into the tops of milk bottles for years, but one person has conceived this clever device. The same principle applies to innumerable other items, not in the molded line but in the metal. Some ingenious individual has worked out a curved little metal piece that you shove behind the base board and the wall and thus control the loose wiring that every home has, carrying light cords to its various floor and table lamps.

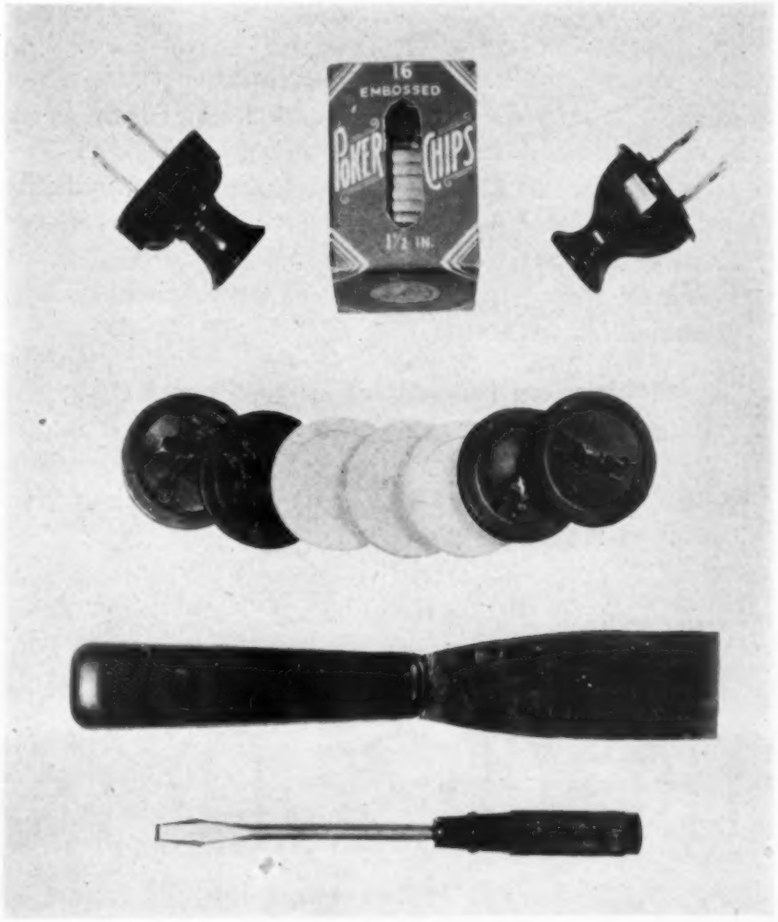
By using the imagination as a result of visits to the ten cent market place, here are a few guesses as to the products that the molding industry could put into this market place and which would appear to be items that could be molded and sold profitably and which are in line with items already carried: laminated foot rules, tops or covers for sick room drinking glasses, shade pull cord ends or pendants, drinking glass coasters, ash trays, candle holders, cabinet and draw pulls as well as molded knobs for kitchen utensil lid covers, door stops, house numbers, lip stick holders, soap dishes and thumb tacks.

Ten Cent Customers Buy An Average of 37 Cents

There is no price cutting on ten cent items. The ten cent item sells for ten cents. The retailer gets full profit on every sale. Customers buying ten cent items usually buy more than one; usually three or more. Woolworth statistics show that the average sale is thirty-seven cents a customer. Items to retail at ten cents must be sold by the manufacturer to the retailer at approximately six cents.

These stores are looking for and want new novelties and household items, preferably colorful products. The volume is large. The buyers' credit and responsibility are excellent.

In the instance of hardware, drug and grocery stores where ten cent counters or bins are established, it has been definitely proved that the merchants' total sales are increased. A druggist in a small city, increased his sales by seventeen percent through the use of the ten cent table, though a check-up in the same city showed that no other merchant had increased his business in the same period over five percent. This was not due entirely to the ten cent item but partially to the fact that the ten cent item attracted additional sales. The tendency to ten cent items is decidedly on the increase. This is particularly true with the drug and pharmaceutical manufacturer. The ten cent market place is worthy of investigation.



Electrical Parts, Chips and Tools With Molded Handles Are Typical Ten Cent Items.

News

W. B. Kochenderfer, formerly in charge of Engineering and Sales for The Lake Erie Engineering Corporation, Buffalo, N. Y., has recently been appointed Chief Engineer of the hydraulic machinery department of R. D. Wood & Co., Philadelphia, Pa., (Works at Florence, N. J.) pioneer builders of hydraulic machinery for the rubber and plastic industry.

Plastic Material From Gas By-Product

ACCORDING to an article in the current issue of the American Gas Association Monthly, the Rochester Gas and Electric Corp. has taken a formerly worthless by-product in the manufacture of coal gas and developed it into a hard substance, which is claimed to be the equal of other plastic materials of the same general type.

a NEW NAME..

ON APRIL FIRST The Scranton Button Company became the AMERICAN RECORD CORPORATION—changing a name that has always been identified with the moulding industry. Such a change will not effect those policies that have been responsible for the success of the company in the production of uniform and accurate moulded products. The new name will now, however, identify the principal activity of the company, since the American Record Corporation is one of the largest manufacturers of phonograph records in the country.

The original name was descriptive of the production of the company when it was founded, and for many years it signified Scranton's quality and dependability for the vast demands of the garment industry. In this manner, many years of valuable experience were gained in the designing and building of better moulds, until today, this company is serving hundreds of other industries with unequaled satisfaction.

Change your records, but remember that the old reliability of Scranton can always be depended upon for quality mouldings in Lacanite, Bakelite, Durite and Durez, manufactured in the world's largest and finest equipped moulding plant.

American Re

Principal Offices and Plant

NEW YORK
50 Union Square

DETROIT
145 Eastlawn Ave.

Let's Answer Those Questions

Of How? And What? And Where?

By Benn C. Budd
O. S. Tyson & Co., Inc.

CO-OPERATIVE efforts by a whole industry depend for their success upon *agreement.* Which is one way of saying that co-ordination is an essential part of co-operation.

At present there is almost unanimous agreement that something should be done along the line of general publicity for the plastic molding industry. In the marketing article in April Plastics, the advertising *volume* covering the entire population at a cost of $20. per week for each unit in the industry was outlined.

Organizing a Plan

There were many interesting answers to that article. And running through these replies was the question "How is Such a Campaign to be organized?" In other words—Where? How? When? Before contributing $1000 it is the most natural thing in the world for a business man to ask to be shown the complete plan, copy, illustrations, publications to be used, printed matter for mailing purposes, in fact everything that he is paying for.

And there are organization details to be explained. Who is going to approve the various advertisements? How is the campaign to be co-ordinated so that all will benefit? What about the intensive market survey and research that should precede such a campaign?

Then Start Action

We can talk about the advantages of a co-operative effort for the next 30 years and be no nearer to it than we are right now. *Action!* that's what's wanted. Action that will answer the questions of how—and where—and why—and what. Not action on the campaign itself but action on the plan.

Action costs money. Skilled counsel must be employed. Research must be undertaken. Copy must be written based on the facts unearthed by the research investigation. This can be done for less than $5,000 and the result will be that every company interested in the molding industry will have before them a complete plan in detail of the proposed effort. Then, and then only, will it be possible to secure the co-operation necessary to put the plan in action.

Then the industry will have a complete picture of the whole effort. Each individual concern will be able to plan their own advertising to take advantage of the general plan, because a co-operative effort is not a substitute for individual effort. Quite the contrary, for it has been proved conclusively that one of the first benefits of co-operative advertising is that it makes the individual's advertising much more effective. Only a small part of the total advertising appropriation of a concern is diverted to the co-operative fund. The balance is expended by the advertiser where, and how he pleases.

The Need Is Conceded

As stated before, there is agreement that *something* should be done. It will cost a few leaders in the industry a few hundred dollars each to find out what this *something* is. One firm has already offered to contribute. Now is a good time to find out how many others are of the same opinion. I will be glad to receive expressions of opinion from these others and next month the result. If conditions are what certain indices indicate we may look forward to the announcement that the Plastics and Molded products industry is ready to take the first and most necessary step toward a goal that means but one thing—more sales.

Metduro Announces New Technical Advances At Annual Meeting

THE eagerly-awaited first annual meeting of Metduro, Ltd., was held in London towards the end of April, the Most Hon. the Marquis of Winchester (chairman of company) presiding. In his address the Marquis stated that the commercial production of the material invented by Professor Schmid—Metduro—has presented difficulties which have not yet been satisfactorily overcome. Professor Schmid, by the agreement for the sale of his invention to Metduro, Ltd., was permitted to place his representative—an expert chemist—in the company's factory to undertake the production of Metduro. However, although sample articles of a very high quality have been made, on which large orders could have been secured, the chemist has failed to produce these articles on a commercial scale. Professor Schmid has now withdrawn his representative and is devoting himself personally to the production of this material.

In order to continue this important experimental research, it was necessary for the company to commence earning revenue, and, for some months past, it has therefore been in negotiation with the Herold A. G., a Hamburg firm manufacturing a product with a basis similar to that of Metduro. This firm, being unable to supply sufficient quantities of its product for both the Continental and British markets, contemplated opening a factory in England. After satisfactory reports had been obtained from an independent well-known chemist, Dr. Otto Oberlander, who examined

For Heating Appliances Fixtures of **TEXTOLITE**

MOLDED BY GENERAL ELECTRIC

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

A HANDLE for a coffee percolator—a knob for a toaster—a thumb rest for an iron—a handle for a water-immersion heater—a switch case for an electric oven—these are among the fixtures of Textolite, custom-molded by General Electric. • Textolite is [illegible] for these applications. It is high in dielectric strength, strong and durable, attractive in color and finish, impervious to moisture, easily cleaned with a damp cloth, and readily handled regardless of the temperature of the appliance. • If there is a part in your product that can be molded, General Electric offers you its engineering service, its research and manufacturing facilities, backed by twelve years' experience in producing more than half a billion moldings. • To get in touch with the Textolite specialist in your district, address the nearest G-E office.

885-36

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

the Herold process, the British company's auditors made an investigation and found that the Hamburg company was not only manufacturing on a large scale, but very profitably as well. As a result Metduro, Ltd., entered into an agreement to acquire the British Empire rights, together with their existing sales organization, and the business of C. Orton Foster, Ltd., Sheffield. Mr. Foster has been appointed joint managing director of Metduro, Ltd., and is in charge of the factory at Waltham Abbey.

The Herold A. G. has undertaken, by the way of guarantee, to equip a plant to produce this material by September next at the Waltham Abbey factory and to provide the services of its chief chemists to commence the manufacture in Britain. In the interim the German firm has agreed to supply Metduro's requirements. Deliveries have already been made to various customers and show a handsome profit. Metduro has, in addition the full benefit of the research work which is constantly being carried out in the laboratories at Hamburg.

"From the opinion of the actual users," declared the Marquis of Winchester, "there can be no doubt that this material will satisfy the most exacting demands of architects, shipbuilders, and decorating business houses, where a substance, having highly hygienic, as well as decorative qualities, is required. At present we are delivering large quantities of this material, under contract, for panelling in two luxury liners at present being built for the Canadian Pacific Railway on the Clyde, and also certain panelling work in a famous London hotel now being rebuilt. A further use has been found in the construc-

tion of lavatory seats, which are thoroughly hygienic, clean in appearance, and better than the usual mahogany, there being no possible chance of absorption. We have already received an important order from one of the large shipping companies for this particular line.

Used In Cutlery Handles

"This product can be adapted to many purposes, and in Germany is largely used for the manufacture of many small articles besides the uses it has for panelling, and a use which we think has a large field for exploitation here is the manufacture of knife handles. This material, under the name of "Ivorax," is already well-known to the Sheffield cutlery trade, and will, we believe, largely displace celluloid in the manufacture of knife handles, as it is non-inflammable, always retains its color, and will withstand heat to almost any extent."

The following opinion of "Ivorax" has been expressed by the Sheffield Cutlery Manufacturers' Association in a letter addressed to C. Orton Foster:—

"It is our opinion that this material will eventually take the place of celluloid, which is being used at the present time. 'Ivorax' is superior to celluloid in many ways, as, in addition to being non-inflammable, it will not shrink, a very important feature, particularly in hot climates. As you are aware, all the best-class cutlery manufacturers in this city are now making knives with 'Ivorax' handles. It has the qualities of ivory, from which the best quality of table cutlery was made in the past. 'Ivorax' is now rapidly establishing itself as a substitute for ivory. Already substantial orders from abroad are coming to hand.

"The material should undoubtedly soon prove popular,

and it is with satisfaction we note that you are making efforts to secure the right to manufacture in this country. Up to now most of the celluloid used by the cutlery trade has been of foreign manufacture, and we consider it will be a great advantage if the manufacture of this material, which we believe will take the place of celluloid, becomes a British industry.

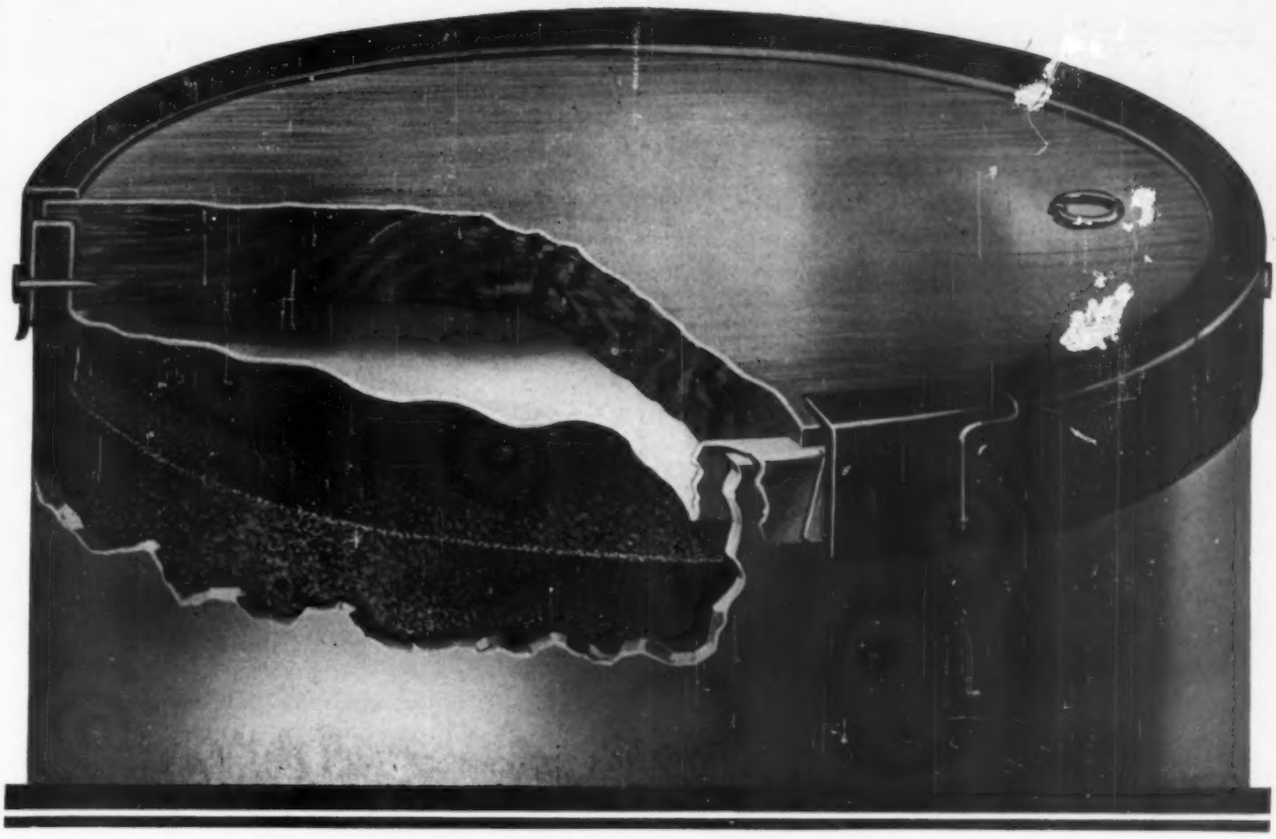
Yours faithfully,
(Sgd.) Sheffield Cutlery
Manufacturers' Association."

Food Containers

Later in his address the Marquis of Winchester referred to the firm's interest in the Papyroplast factory at Penig, Germany.

"We have," he said, "found it necessary to make considerable trials before definitely deciding upon the best form to adopt in alterations to the large rotary plant installed there. Before incurring large capital expenditure, we thought it advisable to obtain the opinion of one of the best-known authorities on pulp machinery in this country, and by the advice of the president of the Institute of Civil Engineers we sent over to Penig Mr. Donnison, whose report bears out the proposals with regard to alterations in design suggested by our own engineer.

"We are confident that the plant, when the present improvements now designed, are completed, will enable the manufacture of the containers to become a commercially profitable enterprise. When the trial of the plant has been successfully demonstrated it will give sufficient evidence of our contention that this system of packing merchandise is one which will be wisely adopted by a large number of trades, not only in this country but overseas. A further advantage which we expect from our association with Herold A. G., is that we intend to appoint two of its directors on the board of the Papyroplast Company, as we consider that their knowledge of trading con-



Delivered Quality Made SURE

THE non-returnable Carpenter Drum means positive protection, economy and convenience.

The manufacturer who ships in Carpenter Drums is giving his customer the modern delivery service.

Complete manufacturing and distributing organizations are located at

CHICAGO, ILL.
615 West Pershing Road

CINCINNATI, O.
June St., & Long Ave., Ivorydale

BUFFALO, N. Y.
1200 Niagara Street

CARPENTER CONTAINER CORPORATION

Executive Offices, Technical and Research Departments, 137-147 41st St., Brooklyn, N. Y.

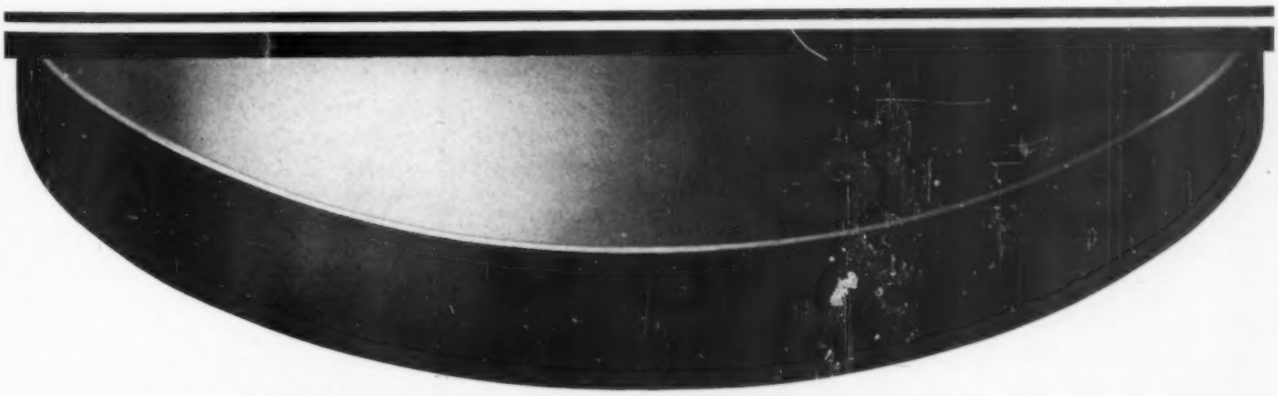
CARPENTER DRUMS

ST. LOUIS, MO.
2731 Papin Street

PHILADELPHIA, PA.
2150 East Huntingdon St.

CLEVELAND, O.
2775 Pittsburgh Ave.

BROOKLYN, N. Y.
137-147 41st St.



When writing Carpenter Container Corp., please mention *Plastics.*

ditions in Germany and their general business ability will be of considerable advantage to this branch of our activities."

Vice-President of Farrel-Birmingham Dies

MR. Francis D. Wanning, for thirty-five years continuously and actively identified with the Farrel-Birmingham Co. and its predecessors in the manufacture of plastic machinery, died recently after an illness of six months. Mr. Wanning was born March 11, 1873, the son of Henry F. Wanning and Harriet Downs Wanning. He attended the Derby high school, being graduated in 1891, entering Yale University from which institution he was graduated in the class of '94S. After completing his studies at Yale he entered the employ of the Birmingham Iron Foundry on October 1, 1894, after traveling in Europe for 4 months. Beginning in the engineering department he entered the business end of the company in the capacity of secretary, continuing in close association with his father its marked progress and success. When the Farrel Foundry and Machine Co. merged into the Farrel-Birmingham company, he was chosen vice president and chairman of the executive board, the latter position he held at the time of death.

Acetate Products Report

The first annual meeting of the Acetate Products Corporation was held recently in London, D. G. Hall, the chairman, presiding. Mr. Hall commenced his address with a statement regarding the firm's new factory. It had been intended to enlarge the factories acquired from the vendor, and it was estimated that that would cost about £150,000 ($750,000). It was eventually decided, however, that it was not only unwise, but impossible, to enlarge sufficiently any one of the existing factories to permit of securing the desired output of

non-inflammable celluloid. The directors had, therefore, decided to erect a factory in the building of which every possible consideration would be given to the requirements of the manufacturing process to be installed with a view to such factory being built on lines conductive to the greatest economy in working.

The new site at Croydon has been leased for 98 years. The process machinery has been purchased on the Continent, and constructed under the supervision of Dr. Muller. Certain sections of the factory are already complete, and others are so well advanced that the erection of the machinery has already commenced, and is energetically being pushed forward. Despite the large number of unemployed, it has been difficult to obtain the necessary additional skilled labor in the locality of the new factory.

Acetate Safety Glass Contracts

"When the plant is complete," declared Mr. Hall, "the directors feel confident that it will only be a very short time before we are working to full capacity, as there is evidence in many directions that the output will be quickly and profitably absorbed. I have so far progressed with certain negotiations that I am sanguine of securing contracts for the supply by the corporation of acetate sheeting to four of the large European glass cartels, for use in the manufacture of safety glass. These contracts call for supplies equivalent to about 50 per cent of the output capacity of the new factory.

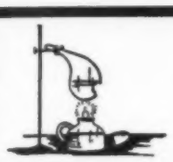
"So far as ordinary celluloid is concerned we are still doing a very large business in the manufacture of battery boxes at our Richmond works. We are doing a very satisfactory business in the factoring of a great variety of sheet materials, rods, and tubes, particularly non-inflammable materials. I cannot give quite such a good report regarding the lacquer section of the business. It has been found necessary to discon-

Advertisers' Index

Say you saw it in PLASTICS

Custom Molders

See Advertisers' Index for Detailed Ads of Molders



Materials
for the Plastics Industries

BUYERS' GUIDE

ACCUMULATORS
The Burroughs Co.
John J. Cavagnaro, Harrison, N. J.
The Dunning & Boschert Press Co., Inc.
Chas. F. Elmes Engineering Works
R. D. Wood
A. B. Farquhar

ALADDINITE
Aladdinite Co.

ALDUR
Aldur Corporation

BEETLE
Synthetic Plastics Co.

BAKELITE
Bakelite Corporation

BLOOD
Jungmann & Co.

CASEIN
Jungmann & Co.
American-British Chemical Supplies, Inc.

CASEIN PLASTICS
Aladdinite Co.
Erinoid Co. of America
Karolith Corp.

CATALIN
Amer. Catalin Corp.

CELLULOSE ACETATE
American-British Chemical Supplies, Inc.
U. S. Industrial Alcohol Co.

CONTAINERS
Carpenter Container Corp.

COTTON FLOCK
Claremont Waste Mfg. Co.
Peckham Mfg. Co.

CUSTOM MOULDERS
Allen & Hills, Inc.
American Insulator Corp.
American Record Corp.
Boonton Moulding Co.
Colt's Patent Fire Arms Mfg. Co.
Diemoulding Production Co.
Garfield Mfg. Co.
General Elec. Co.
Kuhn & Jacob, Trenton, N. J.
Kurz-Kasch Co., Dayton, Ohio
Manchester Mfg. Co.
Monowatt Electric Corp.
Northern Indus. Chem. Co., Boston, Mass.
Norton Laboratories, Lockport, N. Y.
Recto Mfg. Co., Cincinnati, Ohio
Shaw Insulator Co.
Siemon Co.
Jos. Stokes Rubber Co.

DIAMOND TOOLS
F. F. Gilmore & Co.

DUREZ
General Plastics Inc.

DYESTUFFS
General Dyestuff Corp.

ERINOID
Erinoid Co. of America

FIBERLOID
Fiberloid Corp.

FORMALDEHYDE
Roessler & Hasslacher Chemical Co.

GLASS, SILVERED
Standard Mirror Co.

HEAT REGISTERING INSTRUMENTS
Cambridge Instrument Co.
Jewell Electrical Instrument Co.

KAROLITH
Karolith Corp.

LABELS
Economy Ticket & Label Co.

MANICURE ARTICLES
C. J. Bates & Sons, Chester, Conn.

MEASURING MACHINES
F. J. Stokes Mach. Co.

MIRRORS
Standard Mirror Co.

MOLDING EQUIPMENT
Albert & Son, L.
Fred S. Carver, N. Y.
John J. Cavagnaro
Evarts G. Loomis Co.
Terkelsen Machine Co.
Burroughs Co., The
Chas. F. Elmes Engineering Works
Southwark Foundry & Mach. Co.
Standard Machinery Co.
Thropp, Wm. R. & Sons, Co.
Dunning & Boschert Press Co.
French Oil Mill Machinery Co.
A. B. Farquhar
R. D. Wood Corp.

MOLDING POWDERS
Aldur Corp.
Bakelite Corp.
Celluloid Corp.
General Plastics, Inc.
Synthetic Plastics Co., Inc.

PEARL COATING
American Pearl Essence Co.

PHENOL
Dow Chemical Co.

PHENOL RESINOIDS
Bakelite Corporation
General Plastics Inc.

PLASTICIZERS
American-British Chemical Supplies, Inc.
Kuttroff, Pickhardt & Co., Inc.

PREFORMING PRESSES
Arthur Colton Co.
F. J. Stokes Mach. Co.

PYROXYLIN PLASTICS
Fiberloid Corp.
Celluloid Corp.
Du Pont Viscoloid Co.
Nixon Nitration Works

STEEL, TOOL
Wm. Jessop & Sons, Inc.

SWING JOINTS
Burroughs Co., The
Evarts G. Loomis Co.
French Oil Machinery Co.
Flexo Supply Co.

TOOLS
Standard Tool Co.

TUMBLING
Rudolph R. Siebert

UREA-FORMALDEHYDE RESINS
Aldur Corporation
Synthetic Plastics Co., Inc.

VARNISHES, SYNTHETIC RESIN
Bakelite Corp.
General Plastics, Inc.

WOOD FLOUR
Becker Moore Co.
Burnett Co.
Jungmann & Co.
State Chemical Co.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in PLASTICS. Please mention PLASTICS when writing to these firms.

And Now, In Closing:

MORE impressions picked up in the molding industry in the past month . . . more talk about tube bases than anything else . . . most of it uninspired . . . one thing inspirational, though futile, was the flying squadron to Chicago to hold the G.-G. business . . . The feeling that they will all come back in time . . . provided bases are still being molded in the future . . . more power to the printed word (see next paragraph) . . . more unfounded rumours in this industry than any other . . . and many more idle gossips to spread them . . . A decided apathy toward the F. T. Commission, but greater interest in Association work . . . pity anybody who should wear a top-hat to one of the meetings . . . or any kind of hat, for that matter. . . . If the new merger is a fact, the company should be called the Westinghouse General Manufacturing and Electric Radio Corporation of America, Incorporated . . . or just Owen D. Young Company . . . Why all the new plants among the molders? . . . Orders good, but not at all dependable . . . Business about 20% over last month; still under normal . . . Several molders come out publicly and say that Conditions Are Fundamentally Sound . . . we didn't know it was that bad . . . Two molders, heretofore somewhat oblivious to our virtues, say that we have bewildered some of their customers . . . Ha! . . . No new companies, but a raft of unemployment even among the higher-ups . . . we repeat, watch urea . . .

—o—

SPEAKING of power—as we do above—who could believe that nine simple words we printed here last month had the power to drive a molder, a large molder, out of business? The molder is, or at least was, in Massachusetts, and in a circular letter that he sent to others he quoted us as saying that " about six good molders could handle all existing business." He then used this as an excuse to state that some changes were coming in his organization, implying a cessation of hostilities, and asked competitors to quote on his existing business. Of course, he misquoted, for *we* originally made the quotation referred to. He got the words, but not the spirit. He probably will not get any of the quotations right.

—o—

HAVING been in this advertising game ever since we endorsed triangular linen in our infancy, we would like nothing better than to harp on the problem of the Association. H. S. Spencer, however, does it far better in his article; look it up now. Then read Benn C. Budd's third article. In the two of them are enough good suggestions and plans for twenty associations.

—o—

THERE will never be any standardized system of cost estimating. Human needs and wishes, mechanical advantages, production schedules—all vary. The only thing to do is to let each one combine, or take his pick of, all available systems, add his own native ability and work on the result until it fits.

—o—

PERHAPS the hardest thing to make a purchasing agent understand is that any set of standard practices in an industry can protect him even more than the members of that industry. We say can; he must first realize the importance of giving a legitimate profit in order to get the best type of work. He must also be open to reason, suggestion and all salesmen who could improve his product. He must remember, when dealing with the molding industry, that he has asked for the consultation of experienced men,—men who know fully the exacting nature of his work. Every combination of forces can assist him, but he must be a man first and a P. A. afterwards.

—o—

THERE may be no good reason for the Decline and Fall of Rome, but the casein plastic industry can attribute bad business to the women of America. Believe it or not, but women have given up sewing buttons on anything and everything; they even go so far, to use the expression, as to dodge the purchase of buttonable garments. This is essentially a style trend, and the best remedy for it is to find other outlets until buttons again become the vogue. Although buttons are still important, there are newer outlets admirable suited to casein application. One of the most ingenious is in golf clubs, and other industries could make use of this important plastic.

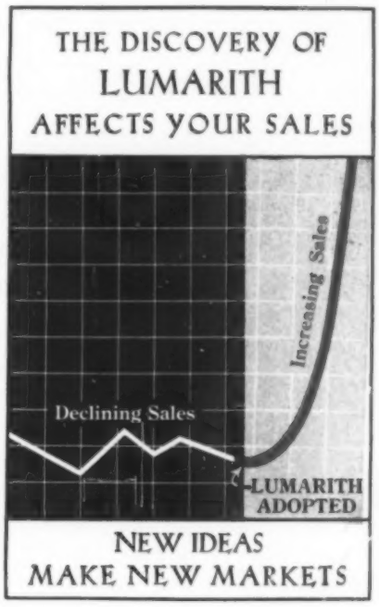
—o—

MOST people feel that this country has a monopoly on all the various trade names in the plastic industry. Investigation discloses that some 80% of the existing names identify some foreign material: any of the newer foreign publications mention materials almost unheard of,—strange creatures of imagination that spring up unasked for and die by request or neglect. A generic name would only add to the confusion. We give a rising vote of thanks for the tabling of such an idea.

—o—

WHY doesn't everybody merge into the Industries of America and get it over with?

Add Beauty to Your Product and You Add Volume to Your Sales



THERE is one old, old fact that can be put to work *today* and will now, as always, increase sales. *Add beauty to your product and you add volume to your sales!*

A new beauty—scintillating, sparkling color-effects—effects that attract—intrigue—please—and irresistibly create sales—that's what's wanted and that's what you can have by just saying one word—"Lumarith".

Lumarith—the new plastic material—has all the colors known to man—and more than mere color, for Lumarith can be molded to produce color effects *never before seen.* The *sparkle* of gems—*glow* of rubies—*sheen* of pearls—all, or any, of these sales-stimulating properties can be put to work increasing your sales.

Gorgeous new effects—or, if you prefer, a perfect simulation of rare old jade—antique ivory—gleaming ebony—gold-flecked onyx—costly quality-look at reasonable cost.

If you are interested in selling *more* at less cost secure a sample of Lumarith. Then you can see and feel and test this new sales-increasing material. Our dictionary hasn't words to describe it—and no printing process can accurately picture it, but the sample will speak for itself. Its story is simple—sales, more sales, better sales. If you are one of the 98% who are interested in increased sales you'll sleep better tonight if you write *now.*

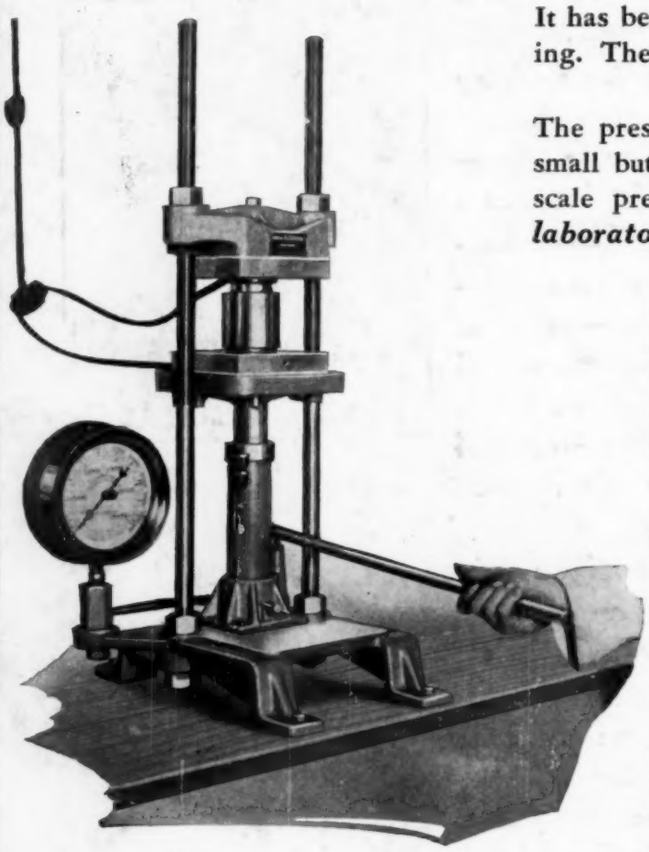
LUMARITH

DIVISION OF CELLULOID CORPORATION

10 EAST 40th STREET - - - NEW YORK, N. Y.

The CARVER LABORATORY PRESS

is a Small Hydraulic Press of True Laboratory Size



It has been carefully developed for p[illegible]ic molding. There has been nothing like it before.

The press is complete in itself, hand operated, small but powerful; designed for accurate small scale pressing tests and control work ***in the laboratory***.

It is supplied with electric hot plates, 6″ square, to operate from a lamp socket, with thermometer pockets for checking temperatures, and a rheostat control if desired.

It is used by the largest firms in the industry, and some of the smallest too, for it is most useful and at the same time inexpensive.

Being standard, the cost is surprisingly small, and both press and equipment may be had from stock. May we send you full details?

FRED S. CARVER

ESTABLISHED 1912

• **93 West Street · New York** •

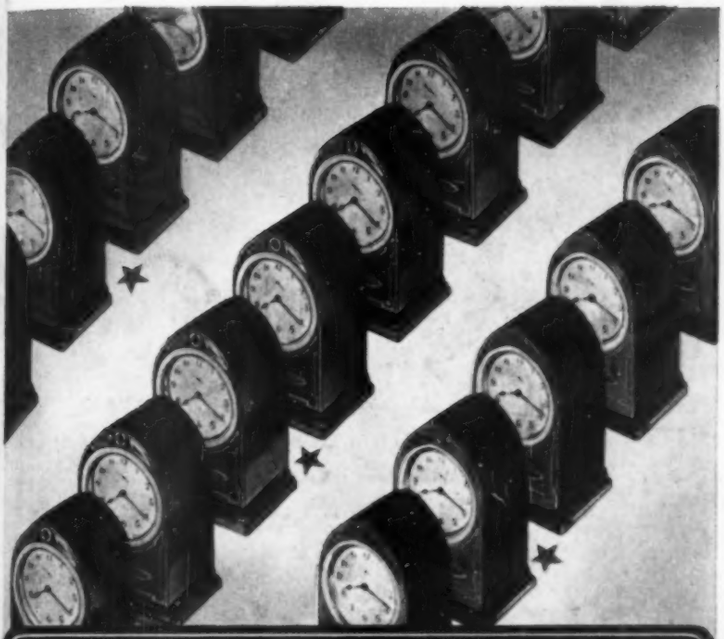
Hydraulic Engineering and Equipment

London — Baker Perkins, Ltd.

PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

Accurate to the second . . . up-to-the-minute in beauty . . . Poole again selects DUREZ!



DUREZ

★ ONE, *or a* MILLION *just like it*

ANOTHER instance of a manufacturer who, making one product better with Durez, turns again to the perfect molding compound as his line expands.

Some time ago Durez was selected for the base and battery container of the Poole electric clock, now being made by The Poole Manufacturing Co., Ithaca, N. Y. Both parts had a rich mahogany effect, polished and smooth as ivory. They were hard, tough, non-brittle. Not affected by warping, splitting, or changes in temperature. Carefully designed, smart-looking, and as accurate as the clock itself! . . . When Poole decided to make clocks in *color*, they again used Durez!

Durez comes in a wide range of beautiful, practical colors. They can be blended, mottled and striated. And that color is not a painting, not a surfacing, not a varnish or enamel. But an integral part of the material itself! Nothing to wear or rub off. Nothing to tarnish. Nothing to dull. Durez *stays* beautiful!

Because of that fact, Durez colors are economical. But for other reasons too: The part is made in one operation! If studs, prongs and inserts are wanted, they are molded in. If lettering or intricate designing is required, it comes out clear, sharp and well defined. If threads are necessary, you'll get them accurate within closest commercial limits. The one operation does it all—*uniformly*—in quantities of ten or a million.

Let us tell you more about the perfect molding compound. Address General Plastics, Inc., 62 East Walck Road, N. Tonawanda, N. Y. Also New York, Chicago, San Francisco, Los Angeles.

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Write for this new free booklet, "Do It With Durez." Illustrated, it contains complete information about Durez . . . physical and dielectric properties, color ranges, and scores of possible applications.

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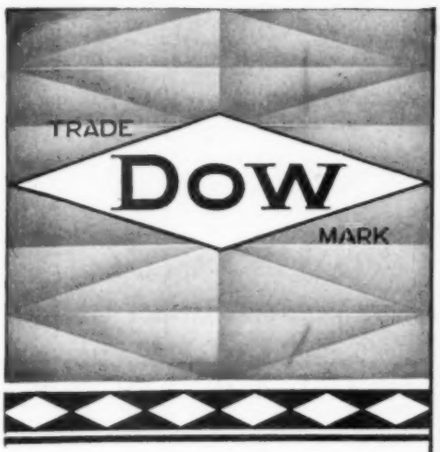

DOW PHENOL

Manufacturers of plastics and molded products who are constantly seeking new and better methods will find the use of Dow Phenol a decided asset. The high quality of this Dow product makes its use especially desirable in processes where uniformity and purity are essential factors. No matter how exacting *your* processes, Dow Phenol will meet every requirement—and more.

Dow Phenol is produced under exacting standards of efficiency in the largest and most modern Phenol plant in the world. Leading manufacturers, who are using many Dow products, know that the Dow trademark is always assurance of quality—and dependability of supply.

Use Dow Phenol once, and its remarkable effectiveness will be readily apparent. We will be glad to quote on your requirements in any quantity for prompt shipment or future delivery —290 lb. drums to tank car lots.

A PARTIAL LIST OF DOW INDUSTRIAL CHEMICALS

Aniline Oil
Calcium Chloride
Carbon Bisulphide 99.9%
Carbon Tetrachloride 99.9%
Caustic Soda
Chloroform
Epsom Salt
Ethyl Bromide
Ethyl Chloride
Ferric Chloride
Ferrous Chloride
Phenol
Magnesium Chloride
Monochlorbenzene
Monochloracetic Acid
Sodium Sulphide
Sulphur Chloride

THE DOW CHEMICAL COMPANY—MIDLAND, MICHIGAN